

# Scientists for Global Responsibility

Special Joint Issue with

*Architects and Engineers for Social Responsibility*

Newsletter

February 2005

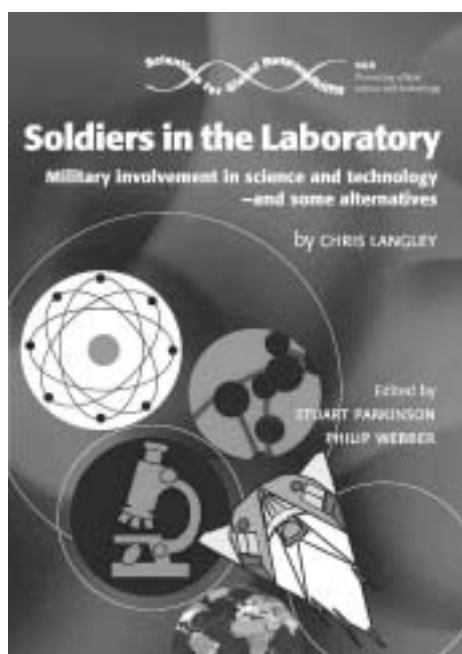
## Challenging the Military Involvement in Science and Technology

**Philip Webber reports on the launch of an important new SGR report**

On 19th January, SGR launched its groundbreaking new report 'Soldiers in the Laboratory: Military involvement in science and technology - and some alternatives' at the Houses of Parliament. We assembled some eminent speakers for the event: Ian Gibson (Chair, House of Commons Select Committee on Science and Technology) and Steven Rose (Professor of Biology, Open University), as well as report author, Chris Langley. The event was chaired by Stuart Parkinson, SGR's Director. Publicity for the launch had drawn a lot of interest, so the committee room we had hired was packed with MPs, scientists, students and representatives from scientific institutions, peace groups, and the media.

Steven Rose described the report as "the most comprehensive document in this field in the last 35 years", and called for the report to be used as a "platform for action". Ian Gibson was also very complimentary and argued that this was the sort of report that science and technology groups should produce more often, with its policy-relevant and broad-ranging analysis.

Interest in the report has been very high. Media coverage of the report included prominent articles in Nature, New Scientist and The Guardian, as well as reports in more specialist publications such as Professional Engineering and even an appearance on BBC British Forces radio! Meanwhile, in the week following the launch over 300 copies of the report



were downloaded from the SGR website.

The report itself, as Stuart Parkinson had explained in his introductory remarks at the launch, was the output of a one year research project documenting the power and influence of the military in science and technology in the UK. Little in the way of detailed investigation into this area had been carried out since the end of the Cold War so a report such as this was long overdue, he said. With the UK's involvement in Iraq continuing and UK military spending set to rise, the timing was especially appropriate.

*Continued on p9*

### Joint Newsletter with AESR

As the next step in developing closer links between the two organisations (see p7), this issue combines the SGR and AESR newsletters in one publication for the first time. News and articles from the two organisations appear side-by-side.

We welcome your views on the newsletter, particularly in this period of transition and possible redesign. Your contributions are always appreciated (see p28 for contact details).

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# News from SGR

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## A few words from the SGR Director...

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### Stuart Parkinson

The launch of our 'Soldiers in the Laboratory' report (see p1) could not have come at a more opportune time. George W. Bush is back in the White House for another four years, the Mutual Defence Agreement (the 1958 treaty which is a cornerstone of the US-UK 'special relationship') has been renewed, the RAF has purchased a further 89 new Eurofighters, and an apparent decision has been made to site US missiles at the Fylindales radar station in Yorkshire as part of the 'Missile Defense' system. The need to expose the massive involvement of the military in science and engineering is indeed urgent. The report we've produced is carefully researched and authoritative - author Chris Langley has done a tremendous job despite the high level of secrecy in this area. The evidence he has amassed clearly shows that narrow thinking on security issues - based on weapons and other military technology - retains a powerful influence over a large section of the UK's scientists and technologists. This at a time when this expertise and the funding to support it are urgently needed in many other areas ranging from renewable energy development

to environmental protection, and disarmament and peace-building to sustainable agriculture. It is simply scandalous that the global aid budget pledged so far to victims of the Asian Tsunami has only just exceeded the Ministry of Defence's annual R&D budget. We are currently putting together a work plan to promote the evidence and views outlined in the report.

It won't have escaped your notice that this newsletter, as promised, is the first joint issue with Architects and Engineers for Social Responsibility (AESR). SGR has also begun hosting AESR material on our website as we move forward with collaborative work. At AESR's AGM last October, they formally voted to explore close links with SGR (see p7) echoing the feeling expressed at SGR's AGM last May. We are continuing to review the ways in which our activities can be made more complementary with a view to presenting formal proposals at our AGM in the autumn. Any comments or thoughts from members on these issues are, of course, always welcome. Members who were not able to attend the last AGM in London but are willing to travel to

Glasgow are invited to meet to discuss this issue (see p7). We will keep you posted on progress.

We are also pleased to announce that our ethical careers programme has received a boost in the shape of a grant from the Body Shop Foundation (see p3). This will allow us to produce further briefings in our very popular series.

This newsletter also includes a report from the last SGR conference, 'From greed to need' (p19). During the summer, and based on the discussions at this conference, we input to the government's consultation on their sustainable development plan (see p3).

Finally, we are looking for volunteers to act as liaison people with other organisations that we are affiliated to: Abolition 2000; Biological Weapons Prevention Programme; Campaign Against Arms Trade; Five Year Freeze; International Network for Engineers and Scientists for Global Responsibility (INES); Network for Peace; WMD Awareness Project.

<StuartP@sgr.org.uk>



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## SGR discusses science strategy with finance minister

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### Philip Webber

Following our lobbying over the UK's ten year science and innovation investment strategy, SGR - jointly with Genewatch and Greenpeace - were able to secure a meeting with the First Secretary to the Treasury, Paul Boateng MP, in September.

As we reported in the last SGR newsletter (Issue 29, p1), as the ten year strategy was being drawn up last spring, SGR, AESR and others lobbied for it to be given a more ethical foundation. We argued that the strategy should have a much stronger focus on helping to tackle environmental and social problems, rather than giving centre stage to economic and military priorities (ibid p4). The strategy, published in July (HM Treasury et al, 2004), gave some limited attention to the issues we

argued for, for example highlighting the importance of R&D on renewable energy and the need to engage more effectively with public concerns, but by and large most of our criticisms and recommendations were not taken up.

Undeterred, we pressed for a meeting with the Treasury (the leading agency in drawing up the science strategy) and on September 8th, Greenpeace's Chief Scientist (Dr Doug Parr), the Deputy Director of Genewatch (Dr Helen Wallace), and I met with Paul Boateng. There was sympathy with some of our collective concerns, but unsurprisingly on any issue we raised, we were pushed to make a financial case. On the basis of the discussions at the meeting we decided to put together a short follow-up submission

on policies and measures for expanding the development of small-scale renewable energy. We will keep you posted on any developments resulting from this.

Meanwhile, of course, we are keeping up the pressure on the military involvement in science and technology through promotion and dissemination of the 'Soldiers in the Laboratory' report (see p1).

<PhilW@sgr.org.uk>

### Reference

HM Treasury, DTI, DfES (2004). Science and innovation investment framework 2004-2014. HMSO, London.

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## New funding for SGR's ethical careers programme

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### Stuart Parkinson

The 'Thinking about an ethical career in science and technology' programme got a boost in November with a very welcome £15,000 grant from the Body Shop Foundation. This grant will enable us to publish several new ethical careers briefings and expand the supporting work we do (talks, web-pages, press-work etc). We'll keep members posted on these activities as they happen.

Meanwhile, the two briefings we published electronically last winter - 'Your career and sustainable development' and 'Unscrambling a space career from military forces' - are now available in print, thanks to a grant from the Scurrah Wainwright

Charity. The six ethical careers publications now available (see p27 for a complete list) continue to be very popular, with 8000 copies now having been distributed (two-thirds electronically from our website: <<http://www.sgr.org.uk/>>) - many to overseas readers. Paper copies of these briefings continue to be available free to SGR members.

SGR continues to run stalls at ethical careers fairs around the country during the autumn and spring terms. In October we ran stalls at two such fairs - at Lancaster University and Bradford University.

### How you can help

Volunteers are always a big help in enabling us to cover ethical careers fairs, especially in the spring term when the majority of these events occur. Please contact Kate Maloney <KateM@sgr.org.uk> if you are interested in helping on a stall in your area.

We're also looking for members who are willing to give tips and advice in response to email enquiries on ethical careers in their profession/discipline. Please contact me if you are interested in helping with this.

<StuartP@sgr.org.uk>

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## SGR inputs to UK sustainable development strategy

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### Stuart Parkinson

Based on the discussions which took place at SGR's conference in May (see p20), the National Co-ordinating Committee put together the SGR input to the Government's summer

consultation on the new UK sustainable development strategy.

The main points we argued were:

- the present strategy gives far too much priority to economic

objectives compared with social and environmental concerns;

- current Government policies on air and road transport are

- 
- incompatible with sustainable development;
- sustainable development, rather than economic growth, needs to be made the driving force behind applied science and innovation, and the UK's ten-year science strategy should be reformed to reflect this;
  - policies and measures to reduce unsustainable consumption in the UK (eg ecological tax reform, controls on advertising) need to be greatly strengthened;
  - a large-scale shift of UK resources from the development and deployment of military technology to measures aimed at international peace-building

- should be carried out, which would in turn support global sustainable development;
- stronger international pressure should be applied to industrialised countries which resist serious action on climate change;
  - international trade regulations should be reformed so that they are much more compatible with sustainable development;
  - some of the headline indicators used by the Government to measure progress on sustainable development should be changed. In particular, Gross Domestic Product should be replaced with a less flawed economic indicator,

while a broader environmental indicator such as the ecological footprint should be added.

SGR's full responses can be found on our web-site at: [http://www.sgr.org.uk/SciencePolicy/Resp\\_SusDevCons\\_2004.htm](http://www.sgr.org.uk/SciencePolicy/Resp_SusDevCons_2004.htm).

The new UK sustainable development strategy is due to be published on 7<sup>th</sup> March.

*<StuartP@sgr.org.uk>*

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## Population, Consumption and Values study group update

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### Alan Cottey

The Study Group 'Population, Consumption and Values' continues to publish its occasional email Newsletter, which is in fact coming out monthly. Population is still something of a 'minority interest', that is, it receives much less attention than consumption in the world-wide mass media and specialist publications. A principal reason for the formation of the PCV group was to promote

consciousness of the importance of population as an essential factor in any considerations of sustainability, and SGR decided that the best way to do this was by linking it, explicitly and continuously, to consumption, and especially to consumption by the rich. As convenor of the group and editor of the PCV Newsletter, I report that there seems to be, in the last year or so, a slightly more relaxed attitude

to generalised discussions about population, and I have usually been able to find a few significant items in each Newsletter. Members are welcome to subscribe to the email Newsletter for free – please contact me. I am also happy to receive news items at any time on any topic within PCV's remit.

*<pcv@sgr.org.uk>*

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## GM issues update

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### Eva Novotny

With the withdrawal by BayerCropscience of the only GM seed variety (the maize Chardon LL) that received government approval for cultivation in the UK, there has been a slackening of activity on GM Issues.

As SGR's GM Issues Co-ordinator, I attended another of the Sustainable Farming and Food Research Priorities Group Stakeholder Workshops sponsored by the Department of the Environment, Food and Rural Affairs. We decided not to attend a third such workshop, however, because the manner of procedure at these workshops was unsatisfactory (as was noted also by others who attended).

In May, I led an SGR Workshop on 'Sustainable Food Systems' held during the annual SGR conference.

At this I presented a flow chart showing how globalisation leads to large-scale, intensive farming, with long transport distances, high use of fossil fuels, degradation of soils, decline in human health and biodiversity, decline of small farms and rural communities, and conflicts related to securement of fuel supplies. Localisation, with small farms (and especially organic farms), on the other hand, allows surrounding communities to flourish, while protecting health and the environment, enhancing soils and making minimal use of fossil fuels.

In October, I assumed my alternative role as a member of the Independent Science Panel and attended an EU Parliamentary Briefing in Brussels,

presenting a short declaration of 'The Needs of Small-scale EU Farmers'. I am expanding this presentation, together with the flow chart mentioned above, into a core document for a new campaign envisioned by Dr Mae-Wan Ho (of the Institute of Science in Society and the Independent Science Panel) and others, towards furthering a sustainable world.

A letter in support of the right to national bans on GM food and crops in EU countries was sent to the Environment Minister in November, as the European Commission prepared to vote on proposals to abolish such a right.

*<EvaN@sgr.org.uk>*

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## SGR at UK Festival of Science, European Social Forum and other events

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### Stuart Parkinson

SGR has continued to supply speakers to and organise sessions at a variety of external events.

In September, we organised a joint session at the annual UK Festival of Science (this year in Exeter) on 'Weapons technology and scientific ethics' with the British Pugwash Group. Three speakers examined issues relating to weapons of mass destruction, while I spoke on 'The ethics of military science and technology'. Also in September, I spoke at an international Pugwash conference in Corsica on 'Science,

ethics and society', again on science and the military.

In October, we assisted in the organisation of three sessions at the European Social Forum (ESF). The ESF is an annual event which promotes alternatives to the mainstream global economic and political system. This year it took place in London. The three sessions SGR helped organise were "Military science and engineering", "The militarisation of the EU" and "Towards citizens' assemblies on research". Co-organisers included several other groups in Europe

including the International Network for Engineers and Scientists for global responsibility (INES), Campaign Against Arms Trade, Association of University Teachers, and War Resisters International. I spoke at two of these workshops.

In recent months we have also supplied speakers to workshops organised by the National Endowment on Science, Technology and the Arts, and the Institute of Energy and Sustainable Development, De Montfort University, as well as AESR's AGM (see p7).

<StuartP@sgr.org.uk>

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## Relief at Ratification of Climate Treaty

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### Stuart Parkinson

The 1997 Kyoto Protocol on climate change overcame the final hurdle to entering into legal force on 18th November, when Russia completed its ratification process (<<http://unfccc.int/>>). The treaty has now been ratified by 128 countries, including enough industrialised countries to exceed the minimum requirements for it to come into effect. The date set for this is 16th February, 2005. The treaty sets the first international legally-binding targets for the control of greenhouse gas emissions. Unfortunately with the withdrawal of the USA and the watering down of some of the operating rules, it is not as strong as it could be, but it remains a very important milestone in international efforts to tackle the climate change problem.

At SGR, we all breathed a sigh of relief when we heard the news. Over the years, SGR has put a lot of work into the climate change issue, most notably during 1997-8 when we co-ordinated 'The Climate Train to Kyoto'. This was where 36 scientists and environmentalists travelled by train from Europe to the negotiations in Japan which eventually resulted in the Kyoto Protocol. The journey attracted a huge amount of international media coverage. Since then, SGR observers have lobbied at subsequent negotiations, notably those at The Hague and Bonn in 2000/1 when many of the operating rules of the Protocol were decided. We have also lobbied over the UK's recent Energy White Paper, and lectured on climate change to a variety of audiences, including on training

courses for staff at the Foreign Office. Our colleagues at AESR have also been active on this issue, most recently publishing a briefing on the energy issues unresolved in the wake of the publication of the Energy White Paper (available on the SGR website at: <[http://www.sgr.org.uk/AESR/AESR\\_EnergyPaper\\_sep03.pdf](http://www.sgr.org.uk/AESR/AESR_EnergyPaper_sep03.pdf)>).

It is clear that our efforts on climate and energy issues will continue to be needed especially because, with the re-election of George W. Bush, international action to tackle climate change will still be too slow.

If you'd like to help with SGR's work on climate and energy issues, please contact me.

<StuartP@sgr.org.uk>

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## Maurice Wilkins 1916-2004

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Maurice Wilkins was one of SGR's prominent sponsors, having been an original sponsor of Scientists Against Nuclear Arms which was formed in 1981, and then of SGR from 1992 onwards. Maurice was awarded the 1962 Nobel Prize jointly with Crick and Watson, for revealing the double-helix structure of DNA.

His move into molecular biology followed his experience as part of the Manhattan project to build the first atomic bomb, in which Maurice was part of a team exploring isotope separation by mass spectroscopy. He apparently considered giving up science altogether and becoming a painter in Paris such was his abhorrence of the human suffering after the second world war and particularly the use of the atomic bombs over Japan.

Maurice was the President of the (now defunct) British Society for Social Responsibility in Science (BSSRS), Food and Disarmament International, a founder member of the Martin Ryle Trust and a trustee of the Science and Society Trust.

Maurice attended and supported many events over the years organised by SANA, the GLC, CND, Pugwash and SGR including the occasional SGR conference.

He was deeply troubled about the weakness of moral and ethical constraints in the exploitation of science, and poor communication between scientists and technologists and the public. To this end he started



up an undergraduate course on the social aspects of science which continues at Kings College.

In many respects Maurice Wilkins' life and choices of career in science reflect the issues that SGR is seeking to bring to the fore in its ethics guides.

Following his move into molecular biology to avoid being involved in nuclear weapons work he was again concerned about the development of chemical and biological weapons and the broader issues of how science should be used. He also supported the campaigns in the 1980s to remove cruise missiles from the UK.

Maurice was by nature a very diffident man preferring to be in the background rather than speaking publicly. He enjoyed quiet private discussions with anyone who was genuinely interested in issues as an equal. Such qualities are often lacking in some eminent academics and others in public life!

On behalf of SGR members now and former SANA members may I say 'thank you' for his moral and practical support of our work over many years. We extend our condolences to his widow Patricia and family.

*Philip Webber*

### MEMORIAL

#### A celebration of the life of

**Maurice Wilkins 1916-2004 CBE, HonLLD, FRS, FKC, Nobel Laureate.**

15.00-17.00 Wednesday 23<sup>rd</sup> February 2005,

Great Hall, King's College London, Strand, London WC2R 2LS

All SGR and AESR members are invited

RSVP Alison Thompson

(Tel. 020-7848 3396, [alison.3.thompson@kcl.ac.uk](mailto:alison.3.thompson@kcl.ac.uk))

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## John Ziman

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We have just learned of the death of John Ziman, one of our most active and supportive sponsors. John had been instrumental in our securing funding for the military influence project, and he was also very helpful to Chris Langley and I during the research for the project. The timing is especially sad since John died just before the launch of the report, although he did read a near-final draft in November and was very pleased with it, so at least he was able to see the fruits of the work. Some of you will remember John from when he was keynote speaker at our 2002 conference. A full obituary will appear in the next newsletter.

*Stuart Parkinson, SGR Director*

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# News from AESR

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## AESR AGM

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### Kate Macintosh

The AGM of AESR took place on 2nd October 2004 in London.

Dr Stuart Parkinson, Director of Scientists for Global Responsibility (SGR), was the guest speaker, opening the AGM. This was because the possibility of a merger between AESR and SGR has been under consideration for the last year.

Stuart told us that SGR was formed in 1992 from the merger of Scientists Against Nuclear Arms, or SANA (founded by Mike Pentz), Electronics and Computing for Peace, and Psychologists for Peace. The remit of SGR included not only the peace concerns of its forebears, but also environmental and science policy issues. SGR works closely with The Martin Ryle Trust, a registered charity. This allows them to make funding applications for the charitable aspects of their work.

In 1997 SGR sent scientists, by train, to lobby at the Kyoto climate change negotiations. They gave lectures en route on the issue of climate change. This received a large amount of international publicity.

In 1998 SGR began working on the issue of GM crops, especially given concerns about long-term health and environmental impacts, and the distorting influence of the corporate sector on agricultural research.

On average a talk is given by an SGR representative every couple of weeks. Many of these events are in universities, and aimed at informing students of the ethical choices which lie ahead of them in their careers.

SGR have published a booklet and a series of briefings on ethical careers (see p3 & p27).

SGR's latest project is investigating the military influence on science, engineering and technology. The researcher they employed to carry out this work was Dr Chris Langley who made a presentation later in the day. The final report was due to be launched at Parliament on 19th January (see p1). Chris highlighted that the arms industry accounts for just 4% of exports but 30% of Government R & D money is for military projects. The Ministry of Defence pays for research up front to develop products; pays for the testing of those products and then buys the products, all with public money. Furthermore, the marketing abroad is subsidized through the Export Credit Guarantee system administered by the Dept. of Trade and Industry.

Kate Macintosh recounted that she had written to Dr Philip Webber, the Chair of SGR, in April 2004. She had attended their conference and AGM on 12th June and explained the history and current state of AESR.

At AESR's AGMs of 2003 and again this year, membership numbers and funds were shown to be gradually dwindling.

SGR is in a much stronger position than ourselves, having a membership of about 600, total income in the previous year of about £45K (including grants for some of its education and research work), 2 part-time members of staff, and a web site

which attracts 1,400 visitors a week. Last year they recruited 72 new members.

The following motion was put to the meeting and carried unanimously:

"This meeting supports the Executive Committee in discussions with SGR to explore methods of cooperation between the two organizations, and, if suitable arrangements can be made for safeguarding the concerns and interests of architects and engineers, after consultation with the membership and sponsors of AESR, to develop proposals for a possible merger of the organizations."

One issue that AESR has to face is that SGR subscription rates are generally higher. Currently, AESR rates are £15 for waged and £5 for unwaged/ students. SGR's rates are £25 for waged, £12.50 for low waged, and £7.50 for unwaged. However, our sub levels have remained fixed for a long period, and hence an increase which takes account of inflation would bring them closer to the SGR levels anyway. It is worth realising, though, that SGR allows its members to pay at a rate of 0.1 per cent of their annual income if they prefer, which can be more suitable for some people.

*Scottish Meeting: AESR and SGR members in the Glasgow area who would like to discuss the issue of a merger, please contact Daphne Wassermann, 51 Westbourne Gdns, Glasgow, G12 9XF, tel 0141 357 0396. Email: <daphne@wassermann.freemove.co.uk>*

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## Biofuels Consultation

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### Martin Quick

AESR responded recently to the government consultation on biofuels for transport. The consultation document set the context for the role for biofuels in the UK, mentioning

climate change, fuel security and diversity of supply. We pointed out that, while the document goes into considerable detail on the potential for greenhouse gas reductions and the

costs of support to achieve these reductions, it gave no credit in financial terms to the benefits of increased energy security that introduction of a significant

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proportion of biofuels for transport would bring.

Any policy should take account of these factors which are particularly relevant to liquid fuels for transport, as many analysts of the oil industry predict that oil production may peak within a decade, followed by a decline in production which has major implications for security. While the document gave the costs of supporting bio-fuels relative to fossil based fuels to four significant figures, it did not take account of the likelihood of a significant rise in the price of crude oil, a scenario which seemed highly likely, and in fact occurred within weeks of the document's issue.

The document's economic assessment seemed to assume biofuel being produced from UK oilseed rape or beet sugar, both of which are high cost inputs (UK sugar is supported at a price three times the world market cost). In addition to the possibility of producing bio-ethanol from lignocellulosics (woody matter) which the document acknowledged as a potential future low cost source (Shell are building a pilot scale plant for this in the UK), sweet sorghum appears to

be good, in terms of yield, fertiliser requirements, energy ratio and cost. It can be grown in a wide range of conditions, but Central and SE Europe would seem particularly suitable locations.

Policies in the area of renewables and greenhouse gas targets need to be addressed on a EU wide basis: thus inputs could be sourced where they can be produced most cost-effectively. Production of energy crops could help alleviate excess agricultural production capacity in the EU, particularly significant since the recent enlargement. We suggested that the UK should press for a much higher target for biofuel production in the medium term in the EU as a whole than the current target.

We proposed that motor vehicle manufacturers should be obliged within a relatively near time-scale to make their products accept fuels with a high bio-fuel content (all major manufacturers in the USA produce some vehicles which will run on 85% bio-ethanol). As important as the introduction of bio-fuels is a major improvement in the efficiency of vehicles. The proportion of transport

fuel that could be met by biofuels would increase significantly if the average fleet fuel economy improves in line with the technical possibilities that are available. The Government should be pressing for more stringent fuel economy targets in the EU after the current target period ends.

We did not comment on what seemed to be a somewhat second order question, what colour should the pipes at fuel pumps be for bio-fuels!

Previous AESR reports<sup>1,2</sup> have pointed out the important role that biofuels could play in transport both in the quite long period before any significant hydrogen energy economy could be developed, as a diverse fuel source to hydrogen, and as an insurance if using hydrogen technology proves particularly difficult, uncertain or expensive.

### References

1. AESR Briefing Paper on Energy.
2. AESR Briefing Paper on Personal Transport. Both briefings are available from the SGR website <<http://www.sgr.org.uk/climate>>.

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## Elsewhere in the News

### Carmakers feel the pinch

Washington-based environmental policy group World Resources Institute and Sustainable Asset Management, an investment group based in Zurich, issued a report stating that General Motors (GM) and Ford stand to lose more, financially, than any other car manufacturers in complying with regulations that the groups expect the United States, Europe and Japan to adopt over the next decade.

Ford would have to spend \$403 more on each vehicle to meet the expected new standards, the report estimates, and GM would have to spend \$377 more. By contrast, the added cost to Honda Motor would be just \$24.

Perhaps the most troubling finding for GM and Ford, the last two major U.S.-based car makers, is that some foreign competitors, particularly Toyota Motor, may actually be helped by tougher regulations because they have already invested much more in

fuel-efficiency technologies, like hybrid gas-electric engine systems, that could generate new profit.

The institute's report forecasts that because of new regulations Ford's profit will be 10 percent lower than would otherwise be expected from now to 2015 and that GM's profit will be 7 percent lower.

*International Herald Tribune 30/6/04*

### Hypersonic nuclear weapons

According to a "senior Whitehall official", Britain should replace its nuclear weapons with Star Wars-style "drones" that can hit a target anywhere on earth in 60 minutes. His report says the Government should develop a hypersonic unmanned weapon as a replacement for the Trident nuclear missile.

It is claimed that such a weapon, "capable of hitting any target on earth within 60 minutes with bombs, sensor swarms, autonomous vehicles etc. is a

realistic ambition for Britain that would provide us with a post-Trident deterrent and a capability to exert global influence".

... and of course create even more pressure for other states to get nuclear weapons in breach of our signature of the NPT!

*Evening Standard 10/12/04*

### New generation of Russian nuclear weapons under development

Moscow revealed the first hints of its secretive new nuclear weapons priorities with a top Russian general saying that a new generation of strategic missiles would soon be mobile on land - and that this was far from the only thing that Moscow had in store.

President Vladimir Putin put the world on alert with an announcement that Russia had conducted tests on new nuclear systems and that they had

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so far gone according to plan. But he gave no further details.

Putin's defence chiefs said separately that Russia was also equipping its nuclear bombers with massive conventional cruise missiles - just like the United States has done for years - and that a pre-emptive "anti-terror" strike could be made any time anywhere in the world.

Western states scrambled for clarification of Moscow's cryptic and mixed messages - all delivered in a steady sequence amid a geopolitical confrontation over the new leadership of Ukraine.

But some Russian military secrets were revealed by General Nikolai Solovtsov, the head of Russia's nuclear force, who said Putin primarily meant that Moscow within the next few years would deploy land-mobile strategic nuclear missiles for the first time.

*Agence France-Presse 10/12/2004*

### **Global warming near the point of no return, taskforce warns**

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Global warming is pushing the world's climate past a point of no

return that could be reached within a matter of years, a prestigious international taskforce has warned.

The group, which includes influential left-of-centre think tank, the Institute for Public Policy Research (IPPR), claims in a report that the planet is little more than one degree away from a global warming danger threshold which it could reach in less than 10 years.

The 14-strong taskforce, established a year ago, has been co-chaired by the former cabinet minister Stephen Byers and the US Republican senator for Maine, Olympia Snowe.

It suggests all G8 countries adopt national targets to generate at least 25% of electricity from renewable energy sources by 2025. It also proposes mandatory cap-and-trade schemes for emissions, such as the EU emissions trading scheme.

*Guardian 24/1/05*

### **Oil firms fund climate change 'denial'**

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Lobby groups funded by the US oil industry are targeting Britain in a bid to play down the threat of climate

change and derail action to cut greenhouse gas emissions, leading scientists have warned.

Bob May, president of the Royal Society, said that "a lobby of professional sceptics who opposed action to tackle climate change" is turning its attention to Britain because of its high profile in the debate.

Prof May's warning was prompted by a meeting of climate change sceptics at the Royal Institution in London organised by a British group, the Scientific Alliance, which has links to US oil company ExxonMobil through a collaboration with a US institute.

In December the Scientific Alliance published a joint report with the George C Marshall Institute in Washington that claimed to "undermine" climate change claims. The Marshall institute received £51,000 from ExxonMobil for its "global climate change programme" in 2003.

*Guardian 27/1/05*

*Summaries by Patrick Nicholson and Phil Webber*

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## **Military Involvement in Science**

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**... continued from page 1**

Chris Langley then outlined the main areas covered by the report. The report's scope spans the involvement of the Ministry of Defence (MoD), military corporations and other agencies from the military sector in UK science, engineering and technology (SET). Despite many difficulties in obtaining data, which is itself of serious concern, the report nevertheless documents how this military involvement exists within research, development, teaching and science communication, and extends across disciplines from engineering and physical sciences, through the life sciences into the social sciences. The scale of the influence is demonstrated by the fact that nearly one third of public funding of R&D (currently approximately £2.6 billion) is spent by the MoD, while 40 per cent of government scientists and technologists work for the MoD. Furthermore, representatives from

military corporations dominate the official advisory panels on both issues of military policy and of military SET. In addition, large numbers of new SET initiatives have been set up in recent years involving UK universities in close collaboration with the military with the main ones being Defence Technology Centres, Towers of Excellence, Defence and Aerospace Research Partnerships, and University Technology Centres.

The report includes extensive background on both the science sector and military issues. In particular, it looks at how narrow commercial agendas within SET interact with the extensive bias within security thinking of 'superiority of military force' arguments, marginalising wider social and environmental concerns. One of the main arguments which the report presents is the need for general acceptance and implementation of a much broader concept of security

needs, encompassing many of the pressing challenges facing the world today, such as climate change, environmental degradation and a range of health and poverty issues.

Four case studies are presented to highlight the relationship between the military and science: biological sciences; nanotechnology; "Missile Defense"; and new nuclear weapons.

The central recommendation of the report is that the government should reallocate a large fraction (between a third and a half in the near term) of the funding currently devoted to military R&D to civil R&D that contributes to peacebuilding, addressing environmental problems and alleviating poverty at a national and international level. Other recommendations argue for an end to any R&D focused on the development of new nuclear weapons; restrictions on military involvement with R&D of emerging

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technologies, such as nanotechnology; and much greater openness concerning the Ministry of Defence's involvement in science and technology. The report also calls for professional scientific and engineering bodies to develop and implement stronger professional ethical codes in relation to the military, and encourages individual scientists and engineers to support attempts to reduce the military involvement in SET.

Steven Rose, in his comments, highlighted the long history of military involvement in UK science and technology, and noted in particular that the record of Labour governments in this area was little different to that of the Conservatives. He also pointed out the negative effect that military involvement can have on public opinion about science. He mentioned that he had, coincidentally, just been approached by the US military to collaborate in making use of some of his brain research – and that he would be declining the offer!

Ian Gibson, in his comments, pointed to the limited resources available for scientific work on issues related to

disease, climate change, poverty etc, and referred to recent reports from his Select Committee – one on non-carbon fuels and one on science in international development policy – as examples. He argued that having a Science Minister in the Cabinet would be helpful in trying to get more balanced government science spending and better use of scientific and technical work by government. He also argued that the Research Assessment Exercise carried out across the UK universities should include an ethical component.

The discussion which followed the speakers was wide-ranging covering issues such as: the lack of openness in science with a military/commercial component; the complexity of the web of political and industrial forces involved in maintaining the status quo; the threat from biological weapons; the need to challenge the UK government over its nuclear weapons; and the exaggerated civil benefits of military R&D. It was pointed out that, while the Labour party in opposition had been pushing for industry to move away from the military sector, in government this

policy has become simply the encouragement of military industry to develop civilian markets in addition to military work. There was also some discussion on trying to enthuse young scientists with 'big' environmental science/ technology projects in the way the Beagle 2 Mars probe had caught their imagination.

In his concluding remarks, Stuart Parkinson called on participants to help spread the messages in the report and support SGR in challenging the high level of military involvement in UK science and technology.

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*All SGR and AESR members and associate members are being sent a copy of the executive summary of the report, and full copies of the 81-page report are available to purchase at the discount price of £7.50 + 10% P&P. (The non-members' price is £12.50 + P&P.) The report is also available as a free downloadable 'pdf' document on SGR's website:*  
<<http://www.sgr.org.uk/>>.

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## Slow Cities

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### **Kate Macintosh describes a growing movement that brings together environmental concerns and an emphasis on local production and consumption**

Cittaslow is a rejection of the homogenisation of towns produced by the multiple chains, where what is heralded as increased choice results in the same range of goods being offered from John O' Groats to Lands End.

The Cittaslow or Slow City movement was started in the small Italian city of Orvieto in 1999 as a development of the Slow Food initiative set up in 1986 as a rejection of the move to Fast Food. Food is important to all of us. The difference is that the Italians fully realise and defend its importance for the health of the consumer and the local economy. The Slow City movement grew from these concerns to embrace a broader agenda for quality of life. Now it has spread across Italy and Europe with over 100 towns in 10 countries joining. It embraces defence of the environment and defence of local

skills and production. If goods are locally produced there is less need for transportation. It is a philosophy which says there are some things the market cannot deliver and that money cannot buy; such things as tranquillity, intimacy, community, beauty - In fact the market and economic growth, unless carefully controlled, destroy such qualitative values. It is not about creating museum towns but the encouragement and nurture of local distinctiveness. It is about local control.

Orvieto has set up a chat-line for citizens' concerns, so that they can monitor the effects of their policies.

In the UK Ludlow has joined this movement and the town of Aylsham in Norfolk, a town which was threatened with the usual array of supermarkets and chains. Now the local family businesses are in a

healthy state and they are thinking of starting a farmers market! Winchester, with the advantage of the most flourishing farmers market in the country, is looking to steer a route down this road, rather than become a smaller version of Southampton. It is proposed that a project be launched for harnessing the river's power for the generation of electricity. The power of the Itchen used to power 6 mills in the city.

It is a characteristic of the movement in UK that it is grass roots generated. The Action for Market Towns Convention in Romsey in September this year, was progress in this direction.

*Web links:*  
<<http://cittaslow.org.uk>>  
<<http://cittaslow.net>>

# Energy, CO<sub>2</sub> stabilisation and economic growth

## Peter Smith looks at the scale of changes that are needed in energy production to tackle climate change

At present we are where the Intergovernmental Panel on Climate Change (IPCC) hoped we wouldn't be by this time, that is, with a concentration of ~380 parts per million (ppm) of CO<sub>2</sub> in the atmosphere. So, where do we go from here?

Since the 1990 IPCC report most of the world has adhered firmly to the 'business as usual' scenario. If we continue on this course until the latter part of the century, atmospheric concentrations could reach 750 – 1000 ppm, judging by levels of CO<sub>2</sub> in 2003. In that year the rate of increase made a massive jump to ~3ppm per year. The IPCC is now saying that our only chance of avoiding possibly catastrophic climate change is to stabilise at no more than 550 ppm by 2025. This is endorsed by the Hadley Centre at the Met Office.

It's not only a matter of stabilising at 550 ppm but also of reducing it to well below the present level by 2100. Is this realistic, bearing in mind that primary energy consumption will rise inexorably during this century? There are those who think we can under certain conditions. The scenario which follows makes a number of assumptions based on the IPCC:

- That the current rate of decrease in primary energy intensity (the amount of energy consumed per unit of GDP) would be maintained to the end of the century.
- That the present rate of decline in the carbon intensity of energy (the amount of carbon released per unit of energy consumed) would also continue to 2100.

The first refers mainly to the demand side; the second to the supply side of the energy infrastructure.

A third assumption needs to be made regarding the growth in demand for primary energy as the developing nations maintain their rates of economic growth, most notably China, and access to electronic goods escalates. One estimate in a paper by D W Aitken, L L Billman and S R

Bull, is that world energy consumption will increase from 380 exajoules (EJ) per year in 1990 to ~1400 EJ in 2100<sup>1</sup>.

The first two assumptions concerning primary energy intensity and carbon intensity impinge directly on the energy efficiency of the built environment as the sector most implicated indirectly in emissions of CO<sub>2</sub>. Maintaining the rate of improvement in energy conservation since 1990 is a formidable challenge. So also is the expectation that buildings will become a major platform for embedded energy, mostly from solar photo-voltaics (PVs). This will be realistic as soon as PVs become cost effective.

However, the stark fact is that, bearing in mind the slow response time and self-interest fixation of human nature, our salvation will not lie with the demand side but the supply side. According to a paper in *New Scientist* "Simple measures like improving energy efficiency would help, but they would not be nearly enough. To ensure we add no more carbon to the atmosphere than we take away will require major structural changes to the global energy industry"<sup>2</sup>. The decarbonisation of primary energy is the key to the stabilisation of atmospheric carbon at a level which, hopefully, will keep climate related damage within remedial limits in the short to medium term. That level is a peak of 550 ppm by 2025 according to the IPCC and declining thereafter.

The next question is: what rate of installation of renewable energy, excluding hydro and nuclear, will be needed to reach this ceiling and then cause the concentration to decline? This is an impossible question to answer because it not only involves the decarbonisation of energy but also in parallel the sequestration of atmospheric carbon by reforestation etc. However Aitken et al make a case which at least gives a picture of the scale of the problem we face<sup>2</sup>.

They recommend a scale of contribution by renewables as:

- 16 – 19% by 2010 rationalised as 10%
- 21 - 26% by 2020 rationalised as 20%
- 30% by 2030
- 50% by 2050
- 80% by 2100.

The next job is to translate these percentages into actual energy.

Year	%	total energy	contribution by renewables
2030	30	757 EJ	227 EJ
2050	50	946 EJ	473 EJ
2100	80	1400 EJ	1200 EJ

To give an idea of the scale of the challenge the 550 ppm target would require an installation rate worldwide of 920 MW per day until around 2050. If there was slippage and the target was raised to 750 ppm even this would necessitate 450 MW of non-hydro power installed per day.

One country which is on course to endorse this scenario is not the UK but Germany (Figure 1).

The Aitken paper gives an estimate of the breakdown of renewables technologies which will contribute to the 80% target by 2100 (Figure 2). This spread would not apply to the UK which enjoys massive power potential from its marine environment. Tidal energy alone could deliver ~60GW.

Academic exercises like this are all very well, but is there the remotest chance that the world can produce 1200 EJ of carbon neutral energy? Two further questions arise from this. First can renewables produce this amount of energy in total? Second, if yes, can they expand at the rate needed to ensure that CO<sub>2</sub> stabilises at not more than 550ppm? This is a question that can remain open. But not for long.

Considering the amount of solar radiation that reaches the Earth it seems logical that ultimately enough energy will be harnessed from this to meet the expanding needs of human society.

There are some who will question the urgency. The reason has been encapsulated in a graph from the IPCC which predicts the long term effect of an increase in atmospheric CO<sub>2</sub> (Figure 3). If emissions concentrations exceed 450ppm the temperature will continue to rise for centuries. Sea level also will continue to rise through a combination of melting ice and thermal expansion well into the fourth millennium, even assuming that anthropogenic CO<sub>2</sub> will ultimately be virtually at zero.

In this scenario things don't look good for the Arctic, the Greenland and West Antarctic ice sheets which could all melt with the persistent rise of temperature leading to a sea level rise of 5 – 12m.

But that's not all. New uncertainties emerge almost by the month. A recent workshop at the Hadley Centre considered the effect of cloud formation on global warming. Cloud cover is falling and the reflectivity of the clouds plays a major part in controlling the radiation reaching the earth. James Murphy of the Centre presented a graph to the workshop which showed that resulting positive feedback could produce peak temperature rises of 6, 8 or 10°C. David Stainforth of Oxford University suggested the possibility of 12°C.

The outcome of this is that James Murphy has revised the standard bell curve showing the predicted extent and probability of global warming. Adapting climate models to take account of these uncertainties produces a 'tail' extending to 12°C, albeit at a low probability (Figure 4).

There is also the problem of high level pollution by particulates from the burning of fossil fuels, forests and crop waste. In the upper atmosphere these create aerosols which have the effect of reducing the solar radiation to the Earth. The 'parasol effect' "could be disguising between half and three quarters of present warming"<sup>4</sup>. Crutzen's estimate could raise the estimate of warming under the

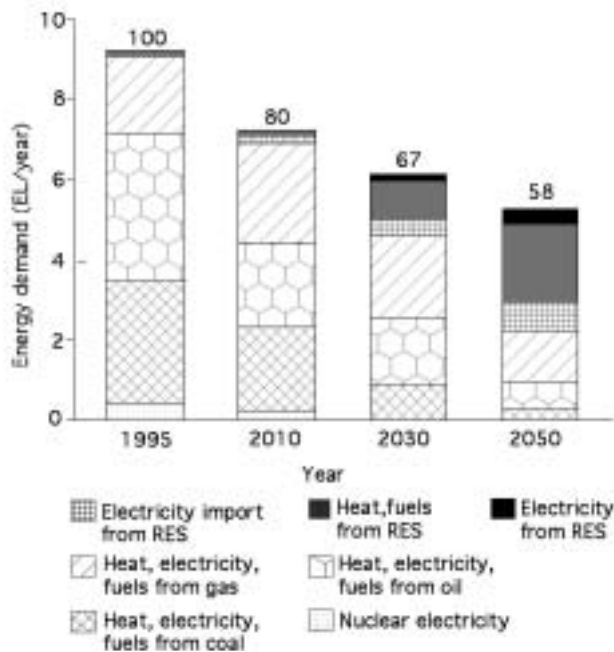


Figure 1. Projected performance of Germany in reducing fossil fuels (*Renewable Energy World*). Note: RES stands for Renewable Energy Systems.

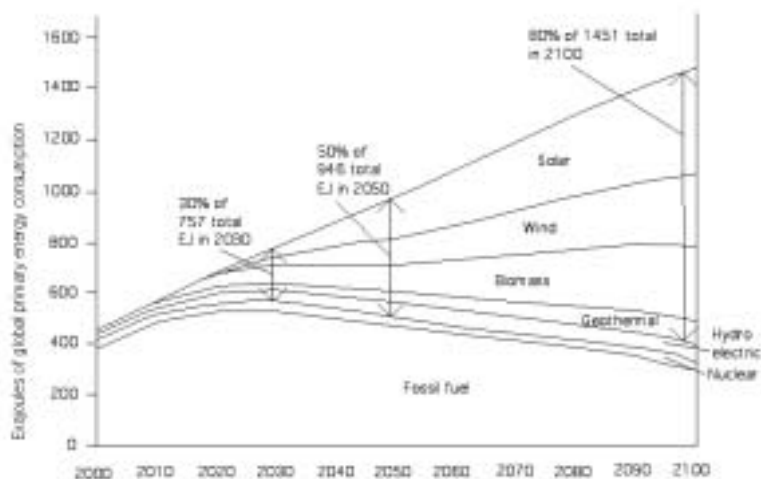


Figure 2. Projection of the 20,30,50,80 scenario to 2100 to support stabilisation at 550ppm with a breakdown of energy sources (*Renewable Energy World*)

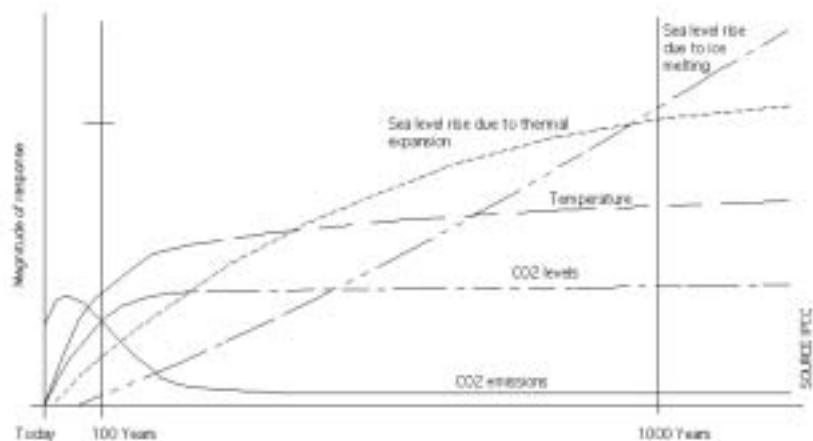


Figure 3. Continuing impacts of climate change following CO<sub>2</sub> stabilisation (*New Scientist*).

550ppmv scenario to 7 – 10°C (Figure 5).

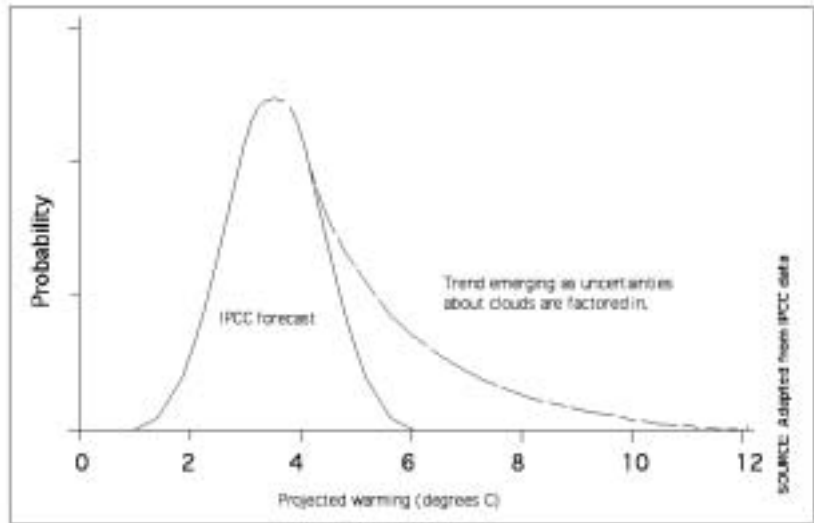
Another uncertainty is the carbon stored in the world's peat bogs which is said to be leaching into the atmosphere at an alarming rate. On one estimate the peat bogs of Europe, Siberia and North America hold the equivalent of 70 years of world industrial emissions. Feedback is operating here in that increased levels of CO<sub>2</sub> in the atmosphere accelerate the release of carbon into rivers as dissolved organic carbon (DOC). Bacteria in rivers rapidly turn the DOC into CO<sub>2</sub> that is released to the atmosphere. Researchers at Lancaster University have found that DOC levels in rivers in the Welsh mountains have increased by 90% since 1988<sup>5</sup>. The verdict of Chris Freeman of the University of Wales at Bangor is that "by the middle of the century, DOC emissions from peat bogs and rivers could be as big a source of CO<sub>2</sub> to the atmosphere as burning fossil fuels"<sup>5</sup>.

Global warming is melting snow, ice caps and mountain glaciers, exposing bare rock, tundra and open water causing the Earth's surface to absorb more radiation from the sun. This positive feedback loop is already in evidence in the Arctic where warming is happening five times faster than the global average. Also, as the world warms so there is greater evaporation from lakes and oceans. Water vapour is a powerful greenhouse gas. Taken together the scientific opinion is that the reduction in the albedo effect could add a further 3°C to warming.

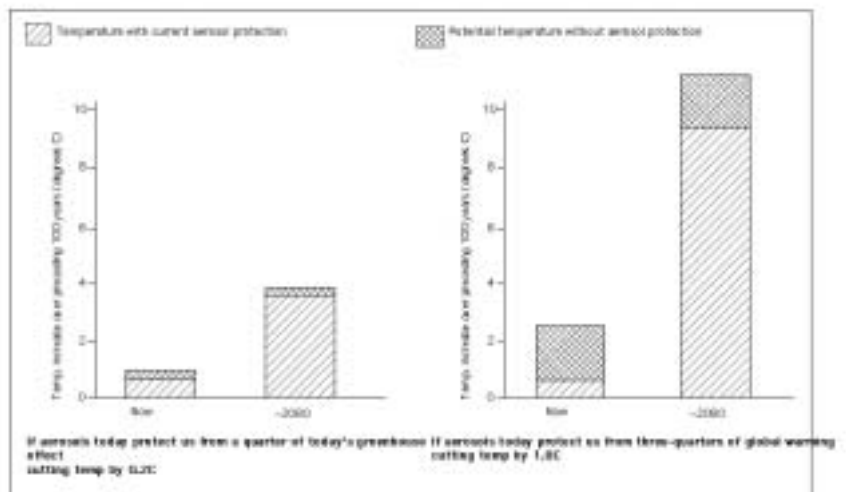
The conclusion of all this is that there is much greater urgency to take radical action to curb CO<sub>2</sub> emissions than is generally acknowledged by governments. Actions we take now, or avoid taking, will have repercussions for centuries to come, and the speed at which we take radical measures to reduce carbon emissions will have major implications for the state of the planet by the year 3000. A delay of decades now could substantially amplify the ultimate effects of global warming. The situation has all the potential to be a tragic demonstration of the butterfly effect.

**A scenario for the United Kingdom**

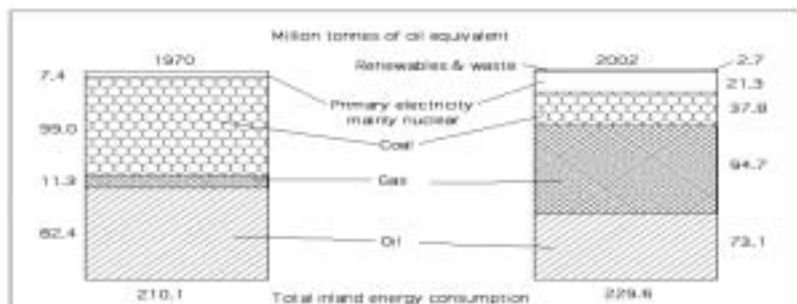
In 2003 the UK consumed 233 million tonnes of oil equivalent (mtoe) or 8.75



**Figure 4. Extended bell curve for temperature and probability<sup>3</sup>**



**Figure 5. Aerosol effect on temperature (New Scientist).**



**Figure 6. Fuel consumption by type 1970 – 2002<sup>7</sup>**

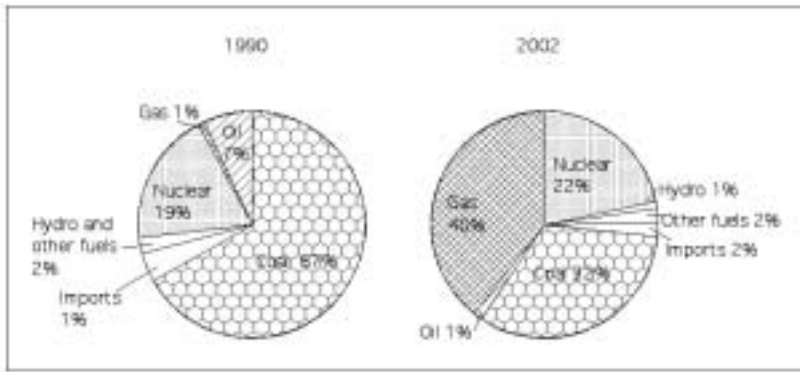


Figure 7. Electricity by fuel type 1990 – 2002 <sup>7</sup>

EJ of energy, including transport. The object is to assess the rate of installation of renewable energy which will be required under the 20-30-50-80 scenario within the context of rising consumption.

In making long term predictions for the UK it is reasonable to assume that, in line with the world prediction, energy consumption will rise at least until 2100. In 2003 final energy consumption rose on average by 2%. In the year 2003 – 4 the total final energy consumption rose by 2.8% <sup>6</sup>.

For the purposes of this study it is assumed that energy consumption will rise at an average rate of 1% per year up to 2100 due to continuing economic growth, particularly with regard to transport. This is the net increase after all the demand side reduction measures have been taken into account.

The position of the UK with regard to CO<sub>2</sub> abatement received a large boost from the switch to gas generation sharply revealed in the DTI histogram (Figure 6) showing the sources of energy in 1970 and 2002. It also indicates that energy consumption rose from 210.1 to 229.6 mtoe. This switch to gas is particularly prominent in the production of electricity between 1990 and 2002. This fact, combined with the decline in heavy industry, accounts for almost all the CO<sub>2</sub> savings which are being claimed.

The breakdown of consumption for 2002 in mtoe was:

<b>Industry</b>	<b>34.8</b>
<b>Domestic sector</b>	<b>47.9</b>
<b>Transport</b>	<b>54.5</b>
<b>Services</b>	<b>20.0</b>

In addition there were conversion losses of 52.4 and distribution losses and energy industry use of 19.9 mtoe. The temperature corrected total for 2002 including transport was 235mtoe.

Figure 7 highlights the change in fuels for generating electricity between 1990 and 2002.

The long term assumption in the UK scenario is that energy consumption will rise at an average of 1% per year up to 2100 due to continuing economic growth. This is the net increase after all the demand side reduction measures have been taken into account. This has implications for the targets which the Government has set for CO<sub>2</sub> abatement of 60% against 1990 levels by 2050. The scenario used here employs the Aitken et al model of 20% by 2020, 30% by 2050 and 50% by 2050.

Now that this initial benefit has been 'spent', UK emissions are again rising.

A combination of depleted resources and price volatility will probably drive transport increasingly to switch to hydrogen as a fuel, first as a direct fuel and then to power fuel cells.

If it is assumed that the current average conversion efficiency is 25% for all UK transport and 50% equivalent for hydrogen, then the equivalent requirement to 54 mtoe of fossil fuel would be 27 mtoe of Hydrogen or 1.1 EJ of renewable electricity. This comes well within the estimated renewable requirement even when reasonable transport growth is factored in. Starting from the UK energy consumption of 235 mtoe in 2002 and incrementing 1% per year, total energy predictions and renewable energy targets to 2100 would be:

Year	%	total energy EJ	renewable energy EJ
2020	20	11.8 (281 mtoe)	2.4 (56 mtoe)
2030	30	13.0 (310 mtoe)	3.9 (93 mtoe)
2050	50	15.9 (379 mtoe)	7.9 (189 mtoe)
2100	80	26.2 (623 mtoe)	21.0 (498 mtoe)

The stark conclusion is that the contribution from renewable sources in 2100 will need to be well over twice the total energy expended in the UK in 2004. Even by 2050 it will be close to the current total level of 233mtoe. This highlights the scale of the problem facing the developed countries if CO<sub>2</sub> is to be stabilised at less than the critical tipping point of 550ppm.

At the present state of the technologies, renewable systems could provide ~200 GW of energy from both marine and land based installations<sup>8</sup>. This still leaves a significant energy gap once we factor in transport energy. The UK has the potential to produce biofuels but these will be competing with food crops as it becomes less and less acceptable to import food from long distances. Hopefully some of the technologies being developed to produce large quantities of hydrogen at low cost will become market ready within a decade. Nanotechnology may well provide the answer to the safe hydrogen storage in vehicles.

So, no more procrastination through committees of inquiry, long-life research projects etc. The first priority

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is to reconfigure the grid to enable it to receive power from small-scale distributed generators. Then it must become cost effective (as in Germany) for householders to install photovoltaics, small scale wind and solar thermal systems. At the very least there must be free installation of net metering on demand. At the same time there must be investment in GW scale renewable technologies like tidal and not wait until 2020 before considering anything other than wind.

We know most of what we need to know and could proceed with widespread implementation, unless, that is, the government continues to be fixated on the so-called free market. There has to be a large

insurance premium to be paid for the long term security of the planet and this will not be forthcoming if things are left to market forces. That would be the superhighway to what the IPCC has called "future large scale and possibly irreversible changes in Earth systems" in other words runaway global warming.

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## Keeping Dry, Keeping Cool

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### Martin Quick examines the interaction between some technological and societal means to tackle climate change

#### Background

In AESR News (June 2004), an article by Professor Bill Cranston gives examples of "engineered solutions" to offset the effects of greenhouse gas emissions, for example controlled reflective panels to reduce the absorption of solar radiation and construction of barriers round cities to protect them from rising sea levels. While such measures, together with other ideas for coping with the effects of greenhouse gas emissions, may have a role to play in mitigating climate change and its effects, we must still put the greatest effort in reducing the basic cause of man-made climate change, the emission of greenhouse gases. Ben Matthews of SGR (1) produced a review on various means that have been proposed for climate engineering, including reflective particles in the upper atmosphere, a large reflector in space to intercept some of the sun's energy before it reaches the earth, as well as various means of CO<sub>2</sub> sequestration such as CO<sub>2</sub> capture and storage, and he concluded generally that such proposals had many uncertainties and should not divert efforts from measures to tackle the root causes of climate change.

We will need many approaches both to minimise the severity of climate change and to mitigate its

consequences. However, the priorities should be: 1) reduce energy demand by life-style changes (in the rich industrialised countries), 2) use energy more efficiently, 3) develop and exploit renewable energy sources, ie approaches which reduce the production of CO<sub>2</sub>, rather than deal with its consequences. A letter in the SGR Newsletter (July 2004) "Woolly minded optimism over renewable energy?" from Andrew Ferguson of the Optimum Population Trust says that renewable energy is being oversold, perhaps with the implication that population policy is more fundamental. In my view, giving women control over their fertility is important in its own right, as well as, in the context of global environmental limits, important in complementing technical and institutional measures to reduce greenhouse gas emissions rather than replacing any of them.

#### Keeping Dry

Given the fact that significant climate change is virtually inevitable due to past emissions, and that the rise in sea level is expected to occur over very long timescales even if there are major reductions in emissions, there may well be a need for protective barriers in some places. However, in a country like Bangladesh where a large population is dependent on very low lying land in the delta and the country

is very impoverished, sea barriers seem unlikely to be a solution. The prospect of huge numbers of environmental refugees from countries such as Bangladesh or in Africa due to a loss of productive land caused by flooding, drought and loss of fresh water, and conflicts over loss of these resources are a major concern – highlighted in a recent report produced by consultants for the Pentagon.

While on coasts or estuaries, flood barriers could help protect cities and other high value sites from rising sea levels and storm surges without adverse consequences elsewhere, further up river systems, higher embankments and flood protection walls to protect against more intense rainfall (together with loss of flood plains and tree cover in the upper reaches of rivers which has already occurred on many rivers) can increase flooding downstream. Flooding in the last decade around the Mississippi, Rhine and Severn show the effects of trying to control and engineer rivers too tightly in the face of increasingly severe climate conditions. In some circumstances, removal of flood defences at certain points may be appropriate.

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## Keeping Cool

As climate change becomes more severe, a major concern in the most highly populated parts of the world is likely to be keeping cool, rather than keeping warm. An exception might be, if, as predicted by some scientists, the Gulf Stream is slowed or stopped by diminution of the thermohaline circulation as parts of the salt water in northern Atlantic areas are diluted by fresh water from melting ice, leading to the UK and much of Northern Europe becoming much colder. The "natural" temperature of a country on the latitude of the UK without the effect of the Gulf stream would be more like that of Labrador, Canada.

The concept of artificially increasing the amount of radiation reflected away from the earth's surface is interesting, although there are likely to be ways of doing it less dependent on actions by millions of people as suggested by Bill Cranston. It may be particularly relevant in cities. Traditional buildings and urban layout in the Middle East, North Africa and other hot regions were designed to minimise the effects of extremes of heat, by buildings having light, reflective surfaces and massive thermal capacity to even out the internal temperature between day and night, and with street plans and urban spaces to provide shade. In a move to copy western patterns, unsuitable high rise highly glazed buildings and wide open urban layouts have often been adopted in these places, reliant on energy hungry air conditioning. It would be preferable for us to adopt some of these traditional means of keeping cool. A recent report from Arup R&D (summarised in the journal *Building*) emphasised that even in the UK, many office buildings were likely to become too hot for comfort during summers in the later part of this century, particularly buildings of lightweight construction, and it suggested that as well as adopting Mediterranean working patterns with long siestas, there could be a major shift in the UK population towards the north. If this is the case, the massive building programme in the South East (a region which is predicted to have a water shortfall) looks literally misplaced.

The temperatures in large urban areas are often 5°C warmer (and sometimes as much as 10°C warmer) than the surrounding rural areas. This is due mainly to the large areas of hard dark surfaces on roads and car parks which absorb a high proportion of incoming solar energy, as well as from energy rejected from human activity – such as from motor vehicles, air conditioning and from industries. When building heating is required, inefficiencies in equipment and systems, though not desirable, do contribute to the warmth of the building (even if expensively from electricity rather than from cheaper heating fuels) by their waste heat. When the problem is keeping cool, all inefficiencies add to the problem. Heat rejection from electrical equipment and lighting or from tumble driers within buildings create warmth, and add to the load on air conditioning. Air conditioners add to the heat in urban areas, and providing electricity for the air conditioning, with current methods of energy production, adds to greenhouse gas emissions. As ambient temperatures rise, the coefficient of performance of air conditioner coolers declines. Active heat storage and transport could be used to allow heat from buildings to be rejected by radiation at night. Some cities like New York which are hot in summer and cold in winter could make use of their extensive district heating networks to act as a district cooling system to transport heat from buildings to be rejected away from the city.

All the energy used by vehicles ends up as heat in the surroundings - from the exhaust and cooling system, from the tyres due to rolling resistance (and to a small extent in urban areas, in the air, from air resistance) and from the brakes. Perhaps there should be a heat levy on urban energy use in areas subject to excessive temperature, applied to vehicles via congestion charging schemes. This would benefit vehicles which use less energy at the point of use, such as hybrids with regenerative braking and stop-start technology to eliminate engines running when vehicles are standing still, electric delivery vehicles and urban runabouts and in the longer term, fuel cell vehicles. As a general point, introducing congestion charging should not be done in a way

which reduces the incentives to minimise fuel usage – any offsetting of congestion charging should be by reducing vehicle excise duty rather than on fuel tax.

When it comes to providing energy for air conditioning and cooling systems, given that the greatest demand is during the day and at times of maximum solar input, electricity from solar pv or solar thermal systems (ie where reflectors concentrate sunlight onto a collector for driving a heat engine) would seem to be well suited technologies. Quite large solar thermal systems were built in the 1980s in California, which had promise of being economically competitive until the price of gas fell, and they may well become competitive if, as seems likely, gas prices rise substantially. Alternatively, air conditioning and cooling plants can be operated directly by sunlight, working on the evaporative cycle. Use of these technologies would help to cut an upward spiral of energy use to counter high temperatures leading to more greenhouse gas emissions leading to higher temperatures.

## CO<sub>2</sub> Capture and Storage

CO<sub>2</sub> capture and storage (C&S) is being strongly promoted by the fossil fuel industries, where CO<sub>2</sub> would be captured at large scale energy conversion plants (eg power stations or plants proposed for converting fossil fuels to hydrogen for use in fuel cells) and stored in geological formations (eg depleted gas or oil wells, saline aquifers) or, in some proposals, deep in the ocean. Such processes would require more primary energy for a given amount of usable energy, due to the energy losses in capture, compression and transport of CO<sub>2</sub>, and the security of storage in different media has some uncertainties and marine scientists have grave reservations about sub-sea storage (1). A full and independent evaluation of the potential risks and benefits of C&S is essential before it should be considered for use on a large scale. As with many technologies, the main body of information lies with the promoting organisations, in this case the oil and coal lobbies. It is essential that governments fund fully independent experts in relevant fields who should be given access to the

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basic data in making an open assessment of these technologies. This assessment could include whether storing CO<sub>2</sub>, even if there is a risk of seepage in the long term, would still be beneficial overall. For example, by delaying the onset of positive feedback due to lower take up of CO<sub>2</sub> in the oceans as they warm - a process which depends on the long term integrated effects of greenhouse gas levels - CO<sub>2</sub> storage, even if not permanent, might have long term benefits. A UK government consultation document on strategies for carbon abatement technologies (2) appears to be predicated on the assumption that the UK cannot meet its CO<sub>2</sub> reduction targets without either capture and storage or nuclear power. Public policies appear to be based on economic growth as a given, with environmental security as variables - we should in fact treat avoiding significant irreversible

environmental risks as basic, and economic growth as a variable

### Conclusions

To reduce the risk of devastating climate change, we will need to reduce our energy demands, to use energy more efficiently and to exploit renewable energy sources. Even so, there may be a need for measures to mitigate the effects of greenhouse gas emissions, but we should not sit back and rely on possible technical fixes. Governments are reluctant to tell their electorates that indefinite economic growth with ever increasing road and air travel is not sustainable, but while technology has a vital role to play, it cannot fully offset demands for greater material wealth from an increasing world population.

As architects, engineers and scientists we are at the forefront of efforts to reduce the magnitude of climate change and to mitigate its effects. However, we also should be helping

to raise awareness that an economic system based on ever increasing material production and consumption is not sustainable, particularly in the context of climate change.

*Martin Quick is Vice Chair of AESR*

*NB Apologies to those architects, building services engineers, urban studies experts and others who may have greater expertise in some of the areas I have covered. I have tried to put together a wide ranging viewpoint with the information I have to hand! Please let's have more input!*

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## An Issue of Science

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### David King responds to Anne Chapman's article in the last newsletter, arguing that understanding the social shaping of science is essential in the GM debate

In her article in the last SGR newsletter, Anne Chapman argues that the problems with GM food are issues of technology, not of science. She wants to defend critics of GM food from the charge of being 'anti-science', but does so by claiming that the problems arise not from any flaws within the science, but from its application. She claims that NGOs campaigning against GM food, 'have raised no objections to the science of genetics. What they are concerned about is the technology of genetic engineering.' This means, for example, that debates about industrial agriculture are, 'not debates about science'. She concludes that, 'because technology is one of the things that makes the world that we all share, it is legitimately of public interest and concern', whereas science, by implication is not.

I have to say that this approach shows a totally inadequate understanding of the social shaping of science, and, as a result, an inadequate grasp of what the GM debate is all about. It is sad that

even critics of genetic engineering, in their attempts to defend themselves from the charge that they are, God forbid, 'anti-science', seem to need to fall back on the naive liberal model of science, as something in another realm from social interests and ideologies. Implicit in her comments, and those of some other contributors to the SGR newsletter is the belief that science is, somehow, objective and neutral.

Firstly, some matters of fact. Very few observers of how science works in the real world now believe that any clear distinction between science and technology can be drawn when looking at current practice. This is especially true in genetics, where the gap between basic research and its application has diminished to vanishing point, and as a result, private capital is deeply involved in basic research. The idea that 'the science' of genetics is blameless, merely discovering facts, and that the problem lies with stupid or wicked genetic engineers is absurd, not least

because they are one and the same person. Biotechnology is full of start-up companies founded by university scientists to profit from the results of their basic research.

Secondly, I and many other geneticists and NGOs over the past 20 years, have made considerable effort to dissect the reductionism and other conceptual flaws in genetics. This work has been aimed at showing that the problems in genetic engineering are caused by the conceptual flaws in genetics, which, to a considerable extent, originate in the influence of social forces upon scientific thinking.

There is not space here for a full critique of the liberal model, or to detail the many ways in which genetics is socially shaped. In brief, science is shaped by money, by political ideologies (especially in biology and psychology), but even more crucially by the structural economic imperatives and philosophies of capitalism. These factors influence the underlying theoretical framework, which then

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shapes the questions or problems which research addresses. They also help dictate which research gets funded, and the interpretation of the results. It should hardly need saying that the liberal model, as a professional ideology, has always served two key purposes for scientists: it asserts their absolute authority over their field of specialist knowledge and invalidates any attempts by outsiders to interrogate or problematise what they are doing or how they are thinking; and it allows them to absolve themselves of blame – 'all we do is discover the facts'. In short, it insulates science from outside critique.

From the Scientific Revolution of the 17th century, the role of science in Western societies and economies has always been to control and dominate nature. Although the scientist may or may not have a direct commercial interest, as a social institution, science functions to generate knowledge about nature that will hopefully be useful at some point in generating profit. This is spelt out clearly and explicitly in the writings of Francis Bacon, the key philosopher of the Scientific Revolution. This has always meant that science has been profoundly shaped by capitalism, and has, primarily, served the interests of capital in myriad ways: the big picture is the destruction of a social order based on subsistence and free access to shared natural resources, and the creation of a society in which people must work for others to produce goods that they do not own, and to consume them. This process is always defined in our society as progress. Science is the driving force of technocratic capitalist economic development and modernisation, but this always requires a balance between apparently 'blue skies' research and more goal-oriented projects.

Faced with the complex systems of nature, a key aspect of Western science has always been an analytical reductionism. We concentrate on the rules and elements of a system in order to construct a clockwork, or more recently, information/cybernetic model of it. As a methodology, reductionism is stunningly successful in generating useful and reliable knowledge. (We can hardly abandon it for holism as some Greens

advocate, especially when that holism is little more than mystification.) But the problem with reductionism is when we come to believe it as a worldview, when it becomes the philosophical basis of our understanding of the world. In doing so we lose our grasp of complexity and of the whole. This in turn leads to over confidence in our technological ability to manipulate. By breaking down the complexity of natural systems and processes into bite-sized chunks, (eg genes), reductionism results in a reified understanding of such systems and processes as static things and properties, and thereby serves the interest of capital by creating commodities which can be sold and patented.

In genetics, reductionism assumes the form of genetic determinism. Geneticists discover a correlation between a genetic variation and a phenotype, x and say they have discovered 'the gene for x'. This assumes a straightforward mechanistic connection between the gene and x (which, sometimes is correct), ignoring the many levels of complexity within organisms. They then proceed to transfer the gene to another organism, using genetic engineering technology, expecting that the new characteristic will be expressed in the engineered organism. This is not the place for a long list of the failures of this approach to achieve the expected results; the failures are most distressing in the case of GE animals, which can suffer. The key point is the technological failures are underpinned not by scientists' mistakes or because knowledge is always, necessarily incomplete, but by structural defects in the underlying science, due to its reductionism, and the overconfidence to which this leads.

Even more importantly, we must realise that we are dealing with an integrated reductionist paradigm of socio-technical development. Anne may be right in one sense to say that 'science cannot address' concerns that GM crops extend the industrial agriculture paradigm and the domination of corporations, but it is absolutely wrong to say that 'debates about these technologies are not debates about science'. Because science is both the underlying basis of the paradigm, and at the same time so

influenced by the paradigm's philosophical and economic elements, it is futile and misleading to try to protect science from the justified criticism of the whole paradigm. A less reductionist science would not be such a compliant slave to the economic interests that drive the industrial agriculture paradigm.

The combination of reductionism, political influence and the industrial mindset can be seen very clearly in one of the most heralded scientific achievements of the 20th century, the Green Revolution. The Green Revolution was the introduction of new 'high-yielding varieties' of rice and wheat, mainly in India and other Asian countries, during the 1960s. These varieties, bred in the publicly-funded International Agricultural Research Centres, are credited with dramatically increasing crop yields, thereby making countries self-sufficient in food production and improving overall nutrition. The main technical innovation, for which Norman Borlaug and others were awarded the Nobel Prize, was breeding of dwarf varieties: the shorter stems of these plants allow them to devote more energy to seed production, thereby increasing yield.

The political motivation for the breeding programmes that led to the Green Revolution was always very clear. By the 1940s it was feared that potential food shortages in Asian countries would lead to political instability and Communist takeovers. Thus, the Green Revolution was primarily a technical fix for social problems.

The Green Revolution consisted of the introduction of the Western industrial agricultural model to Third World rural subsistence economies. Not surprisingly, this caused many social and environmental problems. Firstly, the new varieties depended on artificial fertilisers, pesticides and irrigation to give their high yields. Excessive use of water led to the lowering of water tables, whilst the new cultivation methods led to soil erosion and pesticide poisoning. The shorter stems of the plants led to shortages of straw, a vital element in many aspects of the rural economy. Secondly, when they were introduced, the new varieties were not locally adapted to the myriad different

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agricultural ecosystems (and different food cultures), and so often resulted in disastrous crop failures. Local varieties designed for conservative subsistence farming systems were lost, resulting in a loss of gene pool diversity that had been built up over millennia, as farmer-breeders selected seeds best suited to their local environment. This diversity provided the crucial underpinning for food security. Thirdly, the new system was expensive, requiring purchase of seeds, chemicals and access to water and was much more suited to large fields than to small peasant plots. The result was that small farmers became indebted and sold out to large farmers. A subsistence economy was replaced by a market economy, which greatly benefited wealthy farmers. However for the small farmers, the result was

landlessness, poverty and mass migration to urban slums. All indicators of social inequality rose dramatically. The rise of Sikh nationalism and terrorism in the 1970s in the Punjab, the heart of the Green Revolution, has been attributed to the desperation of these uprooted peasants. Similar problems are likely to arise from GM crops, because they are based on the same type of thinking and fit within the same farming system.

The root of these problems is a reductionist conception of the whole socio-environmental system of food production, which ignores its complexity and prioritises a single output, overall yield, above all other factors. Rather than deal with these complexities, the scientists were urged to and agreed to solve 'the

problem' (defined as low crop yields) with a few key genes. The point is not that this is 'all the fault of science', but that Western science is inextricably part of a whole socio-political concept of progress and development, which is consistent with Western capitalist society.

In short, we cannot begin to understand what genetics and genetic engineering means in the world by bracketing off science, and creating an unreal distinction between science and technology. To attempt to do so is fatal to our own critiques, because it accepts the rules of the game as dictated by the scientists' liberal model.

*Dr David King is Director of Human Genetics Alert*

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## Event Reviews

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### **From Greed to Need: Reshaping Consumption and Technology for a Sustainable World**

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**SGR Conference, University of London Union, 15<sup>th</sup> May 2004.**

SGR's 2004 conference was one of the best attended ever, with around 60 participants attending. The day began with a welcome from Phil Webber. The first part of the morning was taken up with the SGR AGM, as has already been reported in the previous issue of the SGR newsletter.

#### **Plenary session**

Roger Levett from Levett-Therivel Sustainability Consultants gave the first invited presentation, entitled "Eco-efficiency of Quality of Life, not Economic Activity". Classic definitions of sustainability concern an aspiration (e.g. human welfare) and a constraint (e.g. environmental). He noted that the UK Government's preferred tool in tackling sustainability is "resource productivity", meaning, effectively, more economic output per unit of environmental damage. This approach

is politically-popular and fits the New Labour agenda, but it isn't working! Resource productivity isn't enough. It has barely kept up with consumption whilst the Intergovernmental Panel on Climate Change is calling for cuts of 60-90% in greenhouse gas emission. New technology isn't necessarily greener – for instance there is evidence that advances in electronic communication actually increase people's desire for physical meetings. Millennial claims for new technologies usually ignore such "rebound effects". The fact is that sustainable consumption means consuming less. Changing people's behavior, for example from car to bicycle use, offers huge improvements. Individual choice does not always give us what we want, since each choice is constrained by choices already made and in turn influence future choices. For example, increased urban car use leads to increased congestion, poorer public transport, movement to the suburbs and ultimately inner city collapse – a result that no-one wanted but was the product of individual rational decisions! The more crowded and complex the world becomes, the more we need collective planning. In summing up, Roger Levett suggested that we need to challenge the idea that economic growth is a measure of

anything useful at all. Sustainability requires decoupling environmental damage from quality of life, rather than from economic growth.

The second plenary talk was given by Simon Dresner of the Policy Studies Institute on "Sustainable Consumption, Eco-Taxation and Social Justice". A common objection to environmental taxes and charges is that they are regressive, i.e. they disproportionately affect the poor. In this talk, Dr Dresner considered whether these regressive effects could be removed or limited through the selection of appropriate taxation or charging schemes. In the field of domestic energy, some 3 million were in fuel poverty (spending >10% of income on energy) in 2001. Poor housing stock and low incomes both contribute to this figure. An uncompensated carbon tax would be very regressive. Dr Dresner suggested that we need to tackle high energy use directly, such as through the National Home Energy Efficiency Programme. Incentives could be given through Council Tax and Stamp Duty for increasing household energy efficiency, followed by implementation of a carbon tax after a 10 year period. Hence people would be motivated to improve efficiency and then taxed if they have not acted. In addition, income from a carbon tax

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could be used to extend the gas network. Moving on to water, Dr Dresner noted that only the North East has surplus water – the South and East are already beyond sustainable consumption. Metering reduces water use by around 17%. Combining a “lifeline” (based on the amount required for basic needs) with a volumetric charge according to Council Tax band represents the optimal approach, with least regressive impact. In transport, Dr Dresner presented a range of options for reducing carbon emissions, including fuel duty, car tax, public transport subsidy, congestion charging and domestic tradable quotas. Concluding, he said there was no evidence that any of the environmental issues discussed could be cost-effectively addressed without the use of the price signal, meaning environmental taxes and charges. The Government has to find the political will to do it.

Questions from the audience for both speakers followed. Several people were concerned that Simon Dresner’s talk was too narrow in scope, failing to outline any political process to create a demand for the changes needed, and not acknowledging that people are actually prepared to pay more to do the right thing. In response, Dr Dresner stated that whilst opinion polls show people agreeing with general ideas, they always object to paying more. One questioner asked why biomass-fuelled combined heat and power, as proposed by a Royal Commission for all new housing, was not mentioned as a possible solution. Another question asked where the influence on behavioral patterns of our present way of life comes from. The role of government was stressed, in setting a national framework, and the example was cited of European cities where cyclists and pedestrians take priority over vehicles.

### Workshops

After lunch, the conference split into four workshops.

Phil Webber led a workshop on “The link between unsustainable consumption and conflict”. This highlighted the links between high consumption, high resource use, conflict, and the related issues of

militarization and climate change. The solutions proposed centred on creating an alternative model of security based on human rights and social justice, and from dismantling the false equation of “more might = more security”.

Tim Foxon facilitated a workshop on “Overcoming the barriers to sustainable energy use”. Out of this discussion came a number of suggestions for SGR to take forward, including promoting the idea of universities as flagships for developing, demonstration and education on sustainable best practice, linking more effectively with other NGOs, pushing for the Government make the 2020 20% renewable electricity target into a firm target, and to extend the obligation to cover renewable heat generation.

The workshop on “The role of new technologies in the transition to a sustainable world” was facilitated by Stuart Parkinson. Issues discussed included the social and technical as a synergistic system, regulation to prevent “design for waste”, building in democratic input to the evaluation of product safety, and the compromise between innovation and prudent caution. The idea of “slow science” (along the lines of the “slow city” movement, see p10) was one interesting concept proposed.

The final workshop dealt with “Moving to a sustainable food system”, and was facilitated jointly by Eva Novotny, and by John Turner and Robin Maynard from FARM. The discussion here covered the problems of the current agricultural system, deriving mainly from the fact that ownership of the “costs” and “benefits” lies with different groups. The polarisation between “agribusiness” and “agriculture” was stressed, the former centred on yields and ignoring everything non-financial, the latter representing a more holistic approach.

After feedback from the workshops, and further discussion from the floor, Stuart Parkinson closed the conference with thanks for all who attended and made it so lively and successful, and special thanks for Kate Maloney for her hard work in organising the event. He noted that SGR will be seeking to use the ideas

and views developed during the conference in formulating its response to the Government sustainable development consultation (SGR duly put together a response to the consultation – see p3 for a summary).

*Patrick Nicholson*

*Interviews with three of the speakers (Roger Levett of Levett-Therivel Consultants, and John Turner and Robin Maynard of FARM) on the issues they discussed at the SGR conference are available on the web at: <<http://www.planetaryvoices.org.uk/environment.html>>. NB You will need specialist software (eg RealPlayer or Windows Media Player) in order to listen.*

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## Sustainable Waste Management

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**AESR Prestige Lecture given by Professor William Powrie, Head of the School of Civil Engineering and The Environment, University of Southampton, at the Institution of Civil Engineers, London, on 21<sup>st</sup> October 2004.**

Professor Powrie founded the University of Southampton Waste Management Research Group, which currently has 26 contributing members. His lecture focused on ‘what is waste and how can it be managed in a sustainable way?’ In relation to the latter point he presented the results of studies by his group into the ‘energy footprints’ of glass and plastics recycling strategies for Southampton.

Definition of waste is not at all a simple matter. It can, for example be defined by its source (household, agriculture, etc.), its constituents (tyres, packaging, etc.), or by regulations (hazardous, clinical, etc.) within all of which the waste may be considered either for recycling (i.e. as a resource), or for energy recovery (i.e. as a fuel) or for disposal (i.e. as an encumbrance). For example, in the period 2001 – 2002 most UK municipal waste went for landfill (78%), 13% for recycling/composting, 8% for incineration with energy recovery, whereas specific ‘refuse-derived fuel’ amounted to <1%.

Sustainability in waste management, whatever path it follows, requires that:

- Outputs from waste processes be released to the environment in a controlled and acceptable way.
- Residues do not pose an unacceptable risk to the environment, and the need for monitoring and after care is not passed on to the next generation.
- Future use of resources, including groundwater, is not compromised by either extraction or disposal.

“The best course of action can be difficult to identify – and may not always follow the widely accepted ‘Waste Hierarchy’ sequence of: Avoid, Minimise, Re-use, Recycle, Recover energy, Dispose. In his discussion of methods, alternatives and ‘energy footprints’ he proposed that, “energy be used as a common currency for the initial assessment of waste (resource) management options”.

His first case study related to recycling and re-use of glass with specific reference to Southampton (glass and metals do not readily either combust or degrade and are therefore prime candidates for recycling). The current UK rate for glass is around 30% but >80% is already being achieved in Germany, Austria, etc. The study concluded that recycling (rather than crushing for use as an aggregate), with kerbside (rather than ‘home-to-bottle-bank’) collection provided a more energy efficient solution overall. If all waste glass in Southampton were so treated sufficient energy could be saved to supply 65 households - possibly 16,500 throughout the UK (out of a national total of around 20M).

A second study investigated the treatment of household plastic waste. This varied greatly across the EU (see Table 1).

Recycling all waste bottles/containers in Southampton would meet the energy demands of some 270 households (equivalent to about 70,000 throughout the UK). However, the embedded ‘energy of manufacture’ of plastic products is very much less than the intrinsic calorific value of the hydrocarbons

within them. The latter is essentially recovered when they are burned and therefore strictly-controlled thermal energy recovery (after kerbside collection) will always be an attractive solution.

In all cases the decision ‘recycle or combust’ will depend on factors such as:

- Cleanliness of waste stream (energy used to clean and sort).
- Availability of facilities for recycling/ power generation.
- Transport costs.
- Scarcity of raw material.
- Quality of recycle.
- Market for recycled material.
- Ultimate fate of recycled material (e.g. use and burn may be better than use, recycle and landfill).

Organic wastes (which are 50-80% water) were discussed at length - possible treatments being biogas production from landfill, anaerobic digestion, gasification / pyrolysis. All of these (and also incineration) present major NIMBY problems, exacerbated by the current lack of properly planned infrastructures to cope with them.

His overall solution for a “balanced waste strategy” was:

- Responsible consumption.

dirty and the resource is not scarce).

- Controlled degradation and biogas recovery from organic wastes (using modern technology).
- Landfill containment for unusable residues.

This does not mean blindly following the conventional ‘waste hierarchy’ for each individual waste type.

To achieve this, we need to

- Make it less easy for producers to externalise environmental costs.
- Make products easier to re-use: encourage design for demanufacture.
- Encourage responsible consumption.
- Break the cycle whereby current waste management practices dictate new infrastructure and hence future practice,
- Become less susceptible to interest group lobbying.
- ‘Join up’ the science input.
- Change waste management practice from disjointed and reactive to holistic and proactive.

He concluded:

- Think resource not waste.

**Table 1. Household plastic waste recycling across the EU**

Recycling recovery	Mechanical	Energy	Total
<b>Austria</b>	<b>20%</b>	<b>30%</b>	<b>50%</b>
<b>Germany</b>	<b>30%</b>	<b>45%</b>	<b>75%</b>
<b>Denmark</b>	<b>~5%</b>	<b>85%</b>	<b>90%</b>
<b>UK</b>	<b>---</b>	<b>---</b>	<b>10%</b>

- Reuse/recycle what is sensible (depending on markets, material degradation, and energy/society costs, which will vary from region to region).
- Consider high calorific value wastes as fuel (especially if it is

- Decide where we want to be in 10 years time and start building for that now.

The lecture was received with acclaim and a highly appreciative vote of thanks proposed by Quentin Leiper who had chaired the meeting.

*Roy Butterfield*

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# Book Reviews

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## Iraq and the War on Terror

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Paul Rogers

Oxford Research Group 2004, 86pp, £7.99, ISBN 0-9511361-7-8.

This book contains a collection of "web-based monthly assessment[s] of trends in US security policy, with particular emphasis on developments in Iraq and in the more general 'War on Terror'", written by Professor Paul Rogers and originally published on the Oxford Research Group website. The collection runs from May 2003, when President Bush officially declared the war over. The briefings are followed by further analyses grouped into phases of the war, and some comments on topics particularly relevant to the 'war on terror', such as "Israel and Palestine", and "al-Qaida and its Associates". The book is rounded off with a brief discussion of the motivations behind the war and the prospects for the future.

I read these briefings as they appeared, month by month, and I was always impressed by the depth and clarity of the analyses and by the straightforward way in which the situation at the time was described. Re-reading them now, all together and in hindsight, it's interesting to see how later events have borne out the analysis. It's also somewhat depressing to note how many of the predictions, in terms of consequences of various policy decisions, have actually come to pass. An example of this is the development of what is now a widespread insurgency in many parts of the country.

As I re-read the briefings, I noticed how Professor Rogers' predictions gradually changed from optimistic suggestions as to how the situation could be improved to much more of a pessimistic "well, this would fix it but I don't suppose they'll consider it" tone. Having said that, a couple of early quotes suggest a certain level of cynicism: "...it is almost impossible for an occupying power to 'win hearts and minds' while simultaneously

conducting a vigorous campaign to kill or capture insurgents."; "...the United States military....does not embrace a culture of peacebuilding as part of its operational outlook." I found myself wondering how different things might have been if they had used their military forces primarily to protect efforts towards reconstruction and restoration of services, thus building trust and popular support.

The US Presidential election is raised as a factor as early as January 2004. I still find it hard to believe that the Iraq war and the steady loss of US military personnel (not to mention the much less widely reported loss of US contractors' lives) didn't play a bigger part in the final result of the election. Indeed, the February 2004 briefing discusses this, pointing out that Bush's position has become weaker (a trend that continues over the remaining briefings in the collection).

When I read the briefings originally, online, I found them very useful as a report on what was currently happening and also as a source of ideas for improving the situation, and by "situation" I mean the broader Middle East as well as Iraq. Now, 6 months later, they still provide several excellent ideas, e.g., handing over to the UN, and resolving the Israel-Palestine situation, for creating greater stability and peace in the Middle East and by extension in the rest of the world. Unfortunately, I suspect that the US is probably even less likely to take up any of these ideas than they were when Professor Rogers (and others) suggested them for the first time, and the rest of the world doesn't seem to have the ability, or perhaps the will, to exert enough pressure on the US to make them change direction. I hope I'm wrong, and I hope that Professor Rogers is also wrong when he concludes his book with the following words: "...unless there is a fundamental change of policy, we are at the onset of a period of conflict that may last thirty years".

Patricia Hughes

## The Comprehensive Nuclear Test Ban Treaty: virtually verifiable now

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Ben Mines

VERTIC Brief no. 3, April 2004, 12pp, ISSN 1740-8083.

[http://www.vertic.org/assets/BP3\\_Mines.pdf](http://www.vertic.org/assets/BP3_Mines.pdf)

The Comprehensive Nuclear Test Ban Treaty (CTBT), banning nuclear tests in all environments, is an oddity. To come into force it requires not only acceptance by its ratifiers and a minimum number of signatories, but it has to be ratified by 44 named states. The most recent such state to ratify was the Congo. Some key nuclear weapon (NW) states, including China, India and the USA, have either not signed or not ratified. Although Bill Clinton signed the US Senate, under his Presidency, refused to ratify - long before 9-11 and our present distress. George W. Bush's USA has firmly declared its rejection of the treaty. Unless George W. sets out on a Pauline journey to Damascus we have no hope of the CTBT's entering into formal legal force within the next 4-5 years. Ben Mines therefore proposes an 'end run' (to use a useful American sporting metaphor) around this problem. Despite the ratification hiatus he shows that there has been substantial progress on the establishment of the verification regime including the setting up and partial activation of a CTBTO (Comprehensive Nuclear Test Ban Treaty Organisation\*). There has been steady development of significantly greater verifiability than envisaged by the CTBT's designers (this, of course, is VERTIC's special interest). Full implementation of the treaty's verification system can arguably be pursued, even without *de jure* entry into force. Such a *de facto* entry into force would echo in a new way the procedures of other recent international agreements including the land mines (Ottawa process) and

Kyoto treaties. With a large majority of international agreement these may be examples of the way in which we shall have to work for a few years. Those who wish to take part will be welcomed; those who do not will be left behind. For the CTBT this will both require substantial good will and depend upon the USA (and China and India) voluntarily and indefinitely refraining from nuclear tests. If a new weapon were ever tested, very little hope for either CTBT or NPT (Nuclear Non-Proliferation Treaty) will remain. Hold your breath.

*Peter Nicholls*

\*see the documents on the CTBTO web site <<http://www.ctbto.org>>.

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## **Tactical Nuclear Weapons: Europe's redundant weapons of mass destruction**

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**General Sir Hugh Beach**

**Published jointly by ISIS, Saferworld UK and ISIS Europe, April 2004, 22pp.**

**<http://www.saferworld.org.uk/iac/WMDBriefing.pdf>**

Hugh Beach's analysis of the tactical nuclear weapon (TNW) problem in Europe echoes some recent previous discussion from sensible (yes) sources in the US (see references 1 & 2) pointing out the dangers and absurdities of NATO's retention of antiquated and possibly insecure NW at a number of US bases throughout Western Europe. In the hopeful moments of 1991-1992 George Bush senior and Mikhail Gorbachev (later Boris Yeltsin) jointly but each unilaterally destroyed or removed a number of smaller NW from the then European front lines. These included devices such as shells and suitcase(?) bombs of interest to non-state actors because they may lack the dual key coded activation systems of the larger NW that prevent accidental or criminal use. But this moment of trust dissipated and numerous weapons remain. They are covered by no current treaty (including the Moscow Strategic Offensive Reduction Treaty). On the Russian side there is concern about their security both

technical and physical. On the NATO side they seem to retain only a political function and no military role. In some cases (Greece? Turkey?) the secure bases may not currently have activatable NW but are stated to retain a 'caretaker' role. In others (the UK, Belgium, Netherlands, Germany, Italy) a small number of weapons do remain; these are the free fall bombs deliverable only by rather short range aircraft (according to NATO the distinction between tactical or substrategic and strategic weapons is a matter of range and not kilotonnage - thus the remaining bombs may be quite big - at least several Hiroshimas in size). The fear is that these are 'place markers' for a new generation of US devices including the so-called bunker busters whose deployment would see the introduction of a 'usable' type of weapon and end hopes of nuclear disarmament. The answer, of course, as pointed out clearly and usefully both by Beach and by his US counterparts<sup>1,2</sup>, is either a TNW Treaty or further unilateral steps to reduce the TNW numbers to zero. Neither step seems likely in the present politico-military climate. We continue to live in fear and to risk despair.

*Peter Nicholls*

1. Millar, A. & Alexander, B. (2002) Uncovered Nukes: Tactical Nuclear Weapons. Fourth Freedom Forum <http://www.fourthfreedom.org/php/t-d-tnw-index.php>. Also available at <http://www.reachingcriticalwill.org/legal/npt/ngorep/TactNukes.pdf>

2. Lennox, R., & Scoville, H. (2003) Briefing Book on Tactical Nuclear Weapons: New Challenges for a New Era. Center for Arms Control and Non-Proliferation. [http://www.armscontrolcenter.org/resources/20030101\\_bb\\_tnw.pdf](http://www.armscontrolcenter.org/resources/20030101_bb_tnw.pdf)

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## **Engineering Nutrition: GM crops for global justice?**

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**Food Ethics Council, September 2003, 28 pp.**

**Available to download from <<http://www.foodethicscouncil.org>>**

**Hard copies may be obtained from The Food Ethics Council, 39-41 Surrey Street, Brighton, BN1 3PB, UK. For enquiries email <[info@foodethicscouncil.org](mailto:info@foodethicscouncil.org)>.**

The Food Ethics Council (FEC) is an independent council for ethical

standards in food and agriculture. This is their sixth report - previous reports have included such things as drug use in farm animals and intellectual property and the farming world. This report is concerned with GM crops and food security. They address three main issues - regulation and policy relating to GM crops, the direction of research aimed at establishing food security, and intellectual property rights and the production of 'pro-poor' agriculture. The report is thoroughly researched, well argued, and soundly documented.

With regard to regulation and policy the FEC argues that "although there are some substantial differences between GM crops, a general moratorium on their use in the EU is not only prudent but an ethical requirement" (4 - page numbers in round brackets). The argument is based on the precautionary principle and a critique of the risk management approach to regulation (12).

According to the precautionary principle it is better to do nothing than to do something risky. The FEC argues that doing nothing should not be given equal weight to the risks of GM crops because this would in effect negate the central point of the precautionary principle which is to create a presumption in favour of safety (12). However they do not acknowledge the difference between doing nothing in wealthy countries where there is no problem of food security and doing nothing in poor countries where there is a problem of food security. In these countries something must be done and the FEC position would be stronger if they considered the viability of non-GM alternatives to doing nothing. In addition, the FEC does not share the view of GM crop advocates that GM crops should be assessed case by case, because, they maintain, "they would each be banned on the same grounds, because of the same area of outstanding scientific uncertainty" (12). They see this as the logic of the EU moratorium on GM crops. The FEC critique of risk management consists of distinguishing the level of risk from the acceptability of risk and arguing that only the level of risk is a matter for the expert judgement of risk professionals. Decision about the acceptable level of risk is an ethical matter and requires a mechanism to

determine the social acceptability of the risk.

The problem the FEC finds in the direction of research aimed at establishing food security is that it is framed too much by the biotechnology industry itself. For example, the development of Golden Rice, aimed at alleviating Vitamin A deficiency, is focused on a single (albeit important) nutritional need. But Golden Rice does not provide a general solution to 'hidden hunger,' the general problem of malnourishment. "Seen from this perspective, single nutrient solutions such as Golden Rice are simplistic attempts to grapple with highly complex problems" (15). Golden Rice is a flagship for the biotechnology industry. It is a development that was made possible through the techniques of biotechnology and has become a symbol of what that technology can do for the poor, whether or not it can help with the more complex problems. The technology is one that was developed in the West and is being offered to the developing world. The main difficulty that the FEC sees in this is that the Golden Rice research programme was set up without consulting the end user. The communities affected by the problem were not consulted except at the end stage of the research. The FEC maintains this is the wrong way around and recommends that "policy approaches to alleviating hidden hunger and food insecurity involve the communities affected in defining the problem and in evaluating potential solutions" (15). Failing to involve the communities in the research planning and design, limits their involvement and choice, and may even result in rejection of the proffered "solution." The Council recommends that instead of pushing for biotechnology "solutions" to the problem of food security, governments should invest in "research driven by the demands of the communities affected by food insecurity" (17). Box 3.3 of the Report (18) provides a useful set of methods for implementing demand-led research.

Concerning intellectual property rights and the production of 'pro-poor' agriculture, the report takes a fairly strong reformist position. In contrast to the current use of patent law which enables owners of GM seed to control

any future use of that seed the FEC recommends that "IP protection applied to plants or animals should not allow the owner to prevent users from re-using or developing their product" (21), and that especially the rights of farmers to reuse and develop seeds should overrule the ownership of such IP. In response to the argument that ownership of IP, and the profit realized from such ownership, provides the incentive for technological progress they reply that the profit incentive should be replaced by cash rewards or prizes. The FEC further recommends that anti-trust rules be introduced and that "[b]ecause 'intellectual property rights' are actually intellectually-based monopoly privileges, they should be named and treated accordingly (21).

Overall the report has a fairly strong reformist view of the genetic modification of crops. The FEC do not see GM technology as the way forward in agricultural development but, rather, as a way for industry in the developed nations to continue dominating the third world. They argue for wide ranging reforms in regulation, research policy and the law of intellectual property so as to benefit the poor of developing nations and to avoid further strengthening the domination of the transnational corporations of the developed world.

*Richard Jennings*

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## **Dr Hadwen Trust's Science Review 2004**

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**Dr Hadwen Trust, October 2004,  
26pp, ISS 1741-0967.**

**For a free copy e-mail the Trust at  
info@drhadwentrust.org.uk or call  
01462 436819**

Readers of this Newsletter and those who have read the material produced by SGR on an ethical career in science and technology will be aware of the various dilemmas which face us in science, engineering and technology today. The question of the moral status of animals and their use in scientific and medical research is seldom discussed within the mainstream biomedical community, and where it is the debate tends to be

based on the dubious notion that all other animals except us have no moral equality with humans. A growing number of voices from the philosophical and scientific community have challenged this insupportable belief and those of us of an optimistic persuasion see changes afoot. But for now those who wish to undertake biomedical research without inflicting pain and suffering there is a practical way forward which can be supported by all sides of the vivisection debate - the use of non-animal methods of research.

The concept of such non-animal methods was accepted as a practical approach in the 1980s, despite its development beginning in the late 1950s. A major step forward in the development of non-animal alternatives came with the discussions of a national centre of excellence to progress the Three Rs (replacing, refining and reducing animal experiments) which was recommended by the House of Lords Select Committee on Animals in Scientific Procedures in their 2002 report. The government recognised the need for such a national centre and in May 2004 launched one under the chairmanship of Lord Turnberg. The centre should serve as a stimulus to tap into the best UK expertise in a range of disciplines including the pharmacological sciences and also co-ordinate a national research initiative to seek non-animal alternatives in research. A major driver of alternative approaches to the use of animals has come in large part from the small, publicly supported humane research charities. The leader in this field is the Dr Hadwen Trust <[www.drhadwentrust.org.uk](http://www.drhadwentrust.org.uk)> based in Hitchin.

In its latest Science Review the Trust describes a portfolio of research, news and reviews, which includes:

- the value of mathematical modelling in medical research
- the support of a ground-breaking human tissue bank
- the development and evaluation of three-dimensional live cell imaging models for brain tumour therapies

- 3-D cell modelling of breast cancer in vitro using co-culturing of various cell types
- understanding migraine through volunteer studies

These approaches address some fundamental questions in biomedicine in ways which are both exciting and satisfy the public's wish to see non-animal alternatives flourish.

*Chris Langley*

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## **Review of Cost-Benefit Assessment in the Use of Animals in Research**

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**Animal Procedures Committee (APC), July 2003, 103pp.**

**Home Office, Communications Directorate. Downloadable from <<http://www.apc.gov.uk/reference/costbenefit.pdf>>**

### **APC**

The Animal Procedures Committee (APC) is a statutory committee established by the *Animals (Scientific Procedures) Act 1986* (The Act) to advise the Secretary of State on matters concerned with The Act. Section 5(4) of The Act states that in determining whether to grant a licence for application of scientific procedures to animals the Secretary of State "shall weigh the likely adverse effects on the animals concerned against the benefit likely to accrue as a result of the programme to be specified in the licence." This Review discusses "the adequacy of the current cost-benefit assessment performed in the course of evaluating project licence applications" (1 - page numbers in brackets refer to the *Review*).

### **A practical publication**

This Review should be of interest to anyone concerned with animal experiments and especially to those involved in, or thinking of becoming involved in, animal experiments. Topics covered by the Review range from the very general ethical issues to the very practical matter of applying to the Home Office (HO) for licences. Of greatest practical use are the summaries of HO guidance on licence application. There are five summaries. The first collates the questions the HO

asks about the validity of the experiments (28). The next two concern the costs (in animal suffering) - (a) the definition and scope of costs considered (37), and then (b) the factors considered by the HO in assessing the cost (38). The fourth collates the factors considered in assessing the potential benefits of the experiment (41), and the last summarizes the advance constraints on the scientific purpose and nature of animal use permitted under The Act (55). The Review also raises questions about the adequacy of various aspects of The Act and of the HO implementation of The Act, questions based on ethical and scientific considerations.

### **Summary**

After a first short chapter introducing the Review and explaining how it came about, the second, somewhat longer, chapter explains the ethical foundations of the discussion of scientific use of animals. The third chapter addresses "The scientific validity of animal experiments" - whether the experiments are relevant to their purposes and reliable. The fourth chapter constitutes about a third of the Review and concerns "The identification and assessment of costs and benefits," though most of the chapter is concerned with identifying and assessing costs (in terms of animal suffering). This includes "social and psychological costs, such as fear, anxiety, loss of memory, confusion, and boredom, as well as more overt physical harms" (82). Chapter five concerns the "Practical procedures for cost/benefit assessment" and chapter six presents "Summary and conclusions."

### **Need to improve HO documentation**

One of the recurrent themes of the Review is the obscurity of HO documentation - both in terms of stating the conditions that must be met to receive a licence for animal experimentation and in terms of the applications that need to be made for licences. It is for this reason that the Review is very practical. It collates from various documents the questions the HO wants answered, and the conditions it asks to be met, by those applying for a licence.

### **Measure of severity inadequate**

In section 4.5.2 of chapter four, the Review provides a detailed analysis of the HO method of measuring the severity of suffering and suggests two revisions of the rules. The first suggestion is that the use of severity bands to measure the suffering resulting from a project is inadequate. The severity band is the suffering of the *average* animal - so that in a large project many animals can suffer substantially even though the project as a whole falls into the mild suffering band. The other suggestion is that the middle range of suffering, moderate, is too much of a catchall and needs further refinement:

"...a new system of recording the severity of the effects actually experienced by the animals is needed, that could be used to enhance the quality and usefulness of the public information provided in the Home Office statistics and also help to indicate progress made in refining animal use year-on-year" (76).

### **Need for greater openness**

One reason offered for clarifying the suffering of animals is that it will provide better information to the public. An important theme that runs through the Review is the need to improve public information about the uses of animals in scientific experiments. Indeed this was the focus of the August 2001 *Animal Procedures Committee report on openness* (<<http://www.apc.gov.uk/reference/reports>>).

### **Conclusion**

The review addresses a number of other important issues such as the duplication of animal experiments, the nonpublication of negative results and the inertia of regulatory agencies in revising regulations which require animal testing. The attention to these issues as well as the ones specifically discussed above, make this an important review and a useful contribution to the cause of animal welfare.

*Richard Jennings*

## Underwriting Bribery: Export Credit Agencies and Corruption

Susan Hawley

The Corner House, 2004, 28pp.

Available to download from  
<[www.thecornerhouse.org.uk](http://www.thecornerhouse.org.uk)>

"As you requested, sir, and the Single Malt for Master James."

"Thank you, thank you. Now young James, that little briefing you fluttered onto my desk, that thingy by the Corner House fellows. Bigger news in a smaller package I've not seen; Export Credit Agencies and corruption? Purported bribe-paying ignored by governments? Well, judge not lest ye be judged I say".

"I had wondered if the scale of the problem might not call for a little judgeme-"

"The scale of it! James, you put your finger on it, government backed, government funded, governments scale opportunities. Look at the

figures! The Turkish parliament estimates \$150 billion a year costs in 2003 from corruption ('corruption' - ghastly word). Our very own UK Export Credit Guarantee Department backs overseas deals with guarantees. You remember the Al Yamamah Hawk/Tornado sales kerfuffle in the 1980s? Alleged 5% to 25% of contract price mentioned in connection with commission. We 'commission' a little, they buy, we earn and the ECGD makes sure we don't lose out. But it doesn't lose out either. If it pays out to one of our claims, it can make a fair stab at getting it back from the country that let us down! Staggering! And here's more! A conservative cost of corruption in China estimated at 3% to 5% of GDP, and China was in the top three recipients of export credits".

"But that's-"

"That is opportunity. Opportunity comes in many forms in business, James, such as hospitality (I detest the prefix Excessive; a guest deserves your finest and will assuredly honour you in return). And on opportunity, perhaps \$148 billion a year lost to corruption in Africa, according to a

recent report - now there's a cash cow with my name on its udders! We're no laggards either; you should read about the UK defence industry. And India's ECA-backed Dabhol power plant - by end of 2000 power was 4 times costlier than from domestic plants; where do you think that markup goes, James? And South America! Do you realise corruption is estimated to cost each person in Colombia and Brazil around \$6,000 per year!"

"Good Lord, that's-"

"It's a loan in all but name! Wealth flows our way but in a generation or two they will have products we want to buy, and so it just flows back again. You must learn to think long-term, James - between 1982 and 2001 ECAs supported over \$7.3 trillion (trillion!) of exports. And how much of that falls between the floorboards - James, are you a man or mouse?"

"... a mouse?"

"Precisely, James. We shall be mice in suits and ties. James, I'm truly indebted to you. Please, please, try my finest".

"Good heavens, your humidor-"

"Is fur-lined, yes. Marvellous for cigars, and of course the finest pelt money can buy - mountain gorilla, no less. A little discrete hospitality on the part of another."

"But aren't they almost extinc-"

"Not to worry! I slipped a few shillings into the CAFOD charity box. I'll see those hairy chappies all right (CAFOD do gorillas? Or is that Unesco? INES, perhaps? I can never remember when the gin starts motoring)".

"Gin, sir? That is the water for Master James' whisky".

"Water. Good Lord. Water. No wonder I feel odd. I always feel odd in unless I hold shares in it... James! pass that briefing again, there's a little something in it about ECA Investment of \$58 billion by 2000 mostly in privatisation of overseas assets. This pamphlet is positively magnificent, a pole star, an absolute beacon".

Jan Tari

### BRIGHTON SCIENCE FESTIVAL

Fri-Sat February 25-26th 2005

City College, Pelham St, The Laines, Brighton

**2005 is a Big Year.** We celebrate three important anniversaries at the Science Festival. One hundred years ago three letters and a number turned the World on its head.  $E=Mc^2$  is a century old. On Saturday evening, February 26th, we have a "Fine Time with Albert Einstein".

**2005 is also the 50th anniversary of the TV remote control.** School projects around Sussex are right now designing a way to turn the TV off without any electronics. (Eat your heart out, Albert).

**2005 is also the 0th anniversary of the Brighton Science Festival** - this is the first one. We hope it and its children will stimulate interest, debate and understanding on science topics down this way for many years to come. On Saturday evening you will be able to put your own point across in DEMOCS, a specially designed game from the New Economics Foundation. A series of cards will give you the facts on any issue, and guide you to a discussion of the issues raised. DEMOCS is Debate-in-a-Box; a smooth journey through rough topics.

If you want to find things to debate about, come to the wide ranging talks on Friday.

If you want the easy ride come to BRIGHT SPARKS, a day of eye-popping wonders and WOWs for Live Wires and their families on Saturday, including news of the Earthship at Stanmore Park, and pedal-powered sound system from local grassroots science group SEASoN.

Visit the website on <<http://www.brightonscience.com>> for details.

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## SGR publications

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### **NEW REPORT: Soldiers in the Laboratory: Military involvement in science and technology — and some alternatives**

This new report by SGR was launched at the Houses of Parliament on Wednesday 19th January 2005 (see p1). The Report and Executive Summary are now available for download or on paper (see p10).

### **Ethical Careers series and other publications**

'Thinking about an ethical career in science and technology' series:

'Unscrambling a space career from military forces' by David Webb (April 2004)

'Your career and sustainable development' by Philip Webber (December 2003)

'Career choice and climate change' by Stuart Parkinson (March 2003)

'Cleaner technologies: a positive choice' by Tim Foxon (March 2003)

'Career choice, ethics and animal experimentation' by Gill Langley (March 2003)

Introductory booklet: 'An ethical career in science and technology?' (Summer 2001)

'Why the War on Iraq is a Warning for the Planet' by Philip Webber and Vanessa Spedding (April 2003)

'Evidence presented to the Chardon LL Hearing: Reports I-V' by Eva Novotny (May 2002)

These SGR publications are free to SGR members and can be downloaded from the website <<http://www.sgr.org.uk>> or ordered from the SGR office - contact details on back page

Also available: SGR Envelope Re-Use Labels at a special price to SGR and AESR members of £3.00 per 100 plus 60p p&p

### **New articles, talks and letters on the SGR website**

To The Chancellor of the University of California, Berkeley In Support of Tenure for Ignacio Chapela - Letter by Dr Eva Novotny and Dr Stuart Parkinson (January 2005)

<[http://www.sgr.org.uk/GenEng/letter\\_IgnacioChapela\\_17jan05.htm](http://www.sgr.org.uk/GenEng/letter_IgnacioChapela_17jan05.htm)>

UK policy on science and innovation - Article by Stuart Parkinson published in 'Science and Public Affairs' (September 2004)

<[http://www.sgr.org.uk/SciencePolicy/Article\\_SPA\\_sep04.htm](http://www.sgr.org.uk/SciencePolicy/Article_SPA_sep04.htm)>

Plus: recent press releases on sustainable development strategy, the military influence on science, etc.

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## AESR publications

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AESR Briefing Papers:

- Energy \*
- Personal Transport \*
- Sustainable Development
- Housing Policies for the Millennium \*\*
- Waste \*\*

Available from AESR for £1 each + £1 p&p (address overleaf) or email <[jj@jakob.demon.co.uk](mailto:jj@jakob.demon.co.uk)>.

\* available to download from "Climate Change and Energy" section of the SGR website, <<http://www.sgr.org.uk/climate.htm>>

\*\* available in electronic form at <<http://www.aesr.org/>>

### Join the SGR Forum email list!

SGR Forum is our internal e-mail list. It is used mainly for news and announcements (of SGR and other events). Forum members also engage in the occasional brief discussion via this channel, for example when a member requests information, advice or help. All SGR members who have internet access are encouraged to join.

To join visit <<http://mailman.greenet.org.uk/mailman/listinfo/sgrforum>> and following the (very straightforward!) instructions from there.

SGR has another email-list on **Population, Consumption and Values**. For more info, or to join this list, please contact Alan Cottey at <[AlanC@sgr.org.uk](mailto:AlanC@sgr.org.uk)>

### AESR email list

AESR runs a Yahoo email list: <[AESR@yahoogroups.com](mailto:AESR@yahoogroups.com)>. Contact AESR (see below) for details of how to join.

**This edition of the Newsletter was edited by Patrick Nicholson, with help from George Finch, Kate Macintosh and Stuart Parkinson.**

**The opinions expressed within, and any inserts, do not necessarily represent the views of SGR or AESR.**

**Please send contributions for the newsletter to <[newsletter@sgr.org.uk](mailto:newsletter@sgr.org.uk)> or the SGR postal address.**

### Architects & Engineers for Social Responsibility

11 West End Terrace, Winchester, Hants SO22 5EN

Tel: 01962 855240

Web site: recent AESR material now appears on the SGR website (see below). Older material can be found at <<http://www.aesr.org>>

### Scientists for Global Responsibility

PO Box 473,

Folkestone,

Kent, CT20 1GS.

Tel: 07 771 883 696

E-mail: <[info@sgr.org.uk](mailto:info@sgr.org.uk)>

Web site: <<http://www.sgr.org.uk/>>

## Events

23 February 2005

### Memorial – Maurice Wilkins

15.00-17.00, Great Hall, King's College London, Strand, London WC2R 2LS.

See p6 for more details

23 February 2005

### Kaleidoscope – voluntary/public sector careers fair

Manchester Academy, Oxford Rd., Manchester, 11-4pm.

There will be an SGR stall at this event.

Tel.: 0161 2752828

Email: [caroline.hutchinson@manchester.ac.uk](mailto:caroline.hutchinson@manchester.ac.uk)

Website: <http://www.careers.manchester.ac.uk>

25-26 February

### Brighton Science Festival

See p26 for details.

5 March 2005

### Europe for Peace Conference

Joint conference between CND and Mouvement de la Paix, at the Mechanics Institute, Manchester.

Email: [gmdcnd@gn.apc.org](mailto:gmdcnd@gn.apc.org)

Website : <http://www.gmdcnd.org.uk>

11-20 March 2005

### National Science Week

Coordinated by the British Association.

Tel.: 020 7019 4937

Email: [nsw@the-ba.net](mailto:nsw@the-ba.net)

Website: <http://www.the-ba.net/>

19 March – 15 April 2005

### Counter Terror: Build Justice

International month of action for peace and justice. Sponsored by Noam Chomsky, Caroline Lucas and others.

Tel.: 0845 4589571

Email: [info@j-n-v.org](mailto:info@j-n-v.org)

Website: [www.j-n-v.org](http://www.j-n-v.org)

26-27 April 2005

### Food Crops in a Changing Climate

Discussion meeting at the Royal Society, 6-9 Carlton House Terrace, London.

Tel.: 020 7451 2500

Email: [info@royalsoc.ac.uk](mailto:info@royalsoc.ac.uk)

Website: <http://www.royalsoc.ac.uk/>

29 April 2005

### British Pugwash Group meeting

AGM and talk with speaker Ana Maria Cetto from the IAEA. Details to be confirmed.

Tel.: 0207 405 6661

Email: [pugwash@mac.com](mailto:pugwash@mac.com)

Website: <http://www.pugwash.org/uk/>

*If you are attending any of these events, don't forget to take along a few SGR leaflets.*